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**THE SHIFTING LANDSCAPE OF ADOLESCENT
WELLNESS IN BOARDING SCHOOLS:
CAN TIME SPENT OFF SCREENS
AND OUTDOORS IMPROVE ADOLESCENT
WELLBEING?**

A Thesis
Submitted to the Faculty
in partial fulfillment of the requirements for the
degree of

Master of Arts in Liberal Studies

by Kristen H. Peterson

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ABSTRACT

For nearly twenty years I have worked directly with adolescents as an independent school educator. Whether in the classroom, on the field, or in the dorm, I have observed and supported students through their middle and high school experiences. During this time, I have witnessed an alarming shift in adolescent physical, emotional, and social wellbeing. Concurrently, I have observed a dramatic increase in the amount of time students spend using screen-based devices, and a decrease in their time spent outdoors.

Using research to ground my anecdotal accounts in empirical understanding, my thesis examines whether or not screen use might help to explain some of the negative trends in adolescent wellbeing. Further, my work explores whether nature could be used as a strategy to prevent and improve many of the emotional and physical concerns we are seeing in teens today.

The structure of my thesis includes three chapters that blend anecdotal stories about my work in boarding schools, with academic research to help explore and explain my observations and experiences. There is also a fourth chapter with recommendations for schools on how to limit students' exposure to screens; engage school constituents in changes to technology policies; and why it is important to build environmental-educational opportunities into the academic and residential life curriculums. It is my hope that by exploring these themes in my thesis, my findings will not only help inform my own work with students, but also provide insights that are broadly relevant and applicable to fellow educators, parents, or anyone who works with adolescents.

PREFACE

I would first like to thank the faculty and staff at Dartmouth College for their support, advice, and encouragement over the years. My deepest gratitude goes to my thesis advisor, Barbara S. Kreiger, who helped me develop a love of storytelling and who gave me the needed confidence to complete my thesis. Even when I doubted my own abilities, Professor Kreiger helped me believe that my knowledge and experiences were worth sharing. I would also like to thank my second and third readers, Anna Minardi and David Van Wie. I am humbled and honored to work with you both and to grow as a writer and practitioner through your invaluable wisdom. My sincere gratitude goes to the late Terry Osborne who taught me how to authentically connect my love of nature with my work in supporting the social and emotional learning of students. My thesis was largely inspired by Terry's guidance as my independent study advisor. I also wish to extend my appreciation to Wole Ojurongbe and Colleen Andrasko in the MALS office for their support throughout my time in the program.

My career in education has allowed me to work with the most amazing students from around the world. Their experiences are not to be overlooked, and without them this thesis would not have been possible. I am grateful for their trust and the many moments of joy, challenge, and discovery they have shared with me. I am also indebted to these strong and courageous women who have influenced me in unimaginable ways: Lauren Cunniffe, Shawn Durrett, Anne Parmenter, Angela Yang-Handy, Lee-Ellen Strawn, Carter Abbott, Kelly Guertin, Cordelia Brady, Lucy Morgan, Mary Mitchell, Debby Ghezzi, Pooja Kothari, Jessica Matzkin, Linda Noll, Katie O'Connell, Jenn Potee, Penn Sullivan, Johanna Callard, and Yolly Thanathammasophon.

My heartfelt love and appreciation goes to my mother, Linda Graham, whose vision for a beautiful life for her children was deeply rooted in her belief in an education. Thank you, Mom, for always believing in me and for your endless love and support. I cherish the many moments you've stayed with us during this process, especially our many evenings out to Zeke's so we could keep the kitchen clean! This thesis is dedicated to you. I also wish to thank my father Ronald Grabowski, my step-father Andy Shilosky, my sister Jillian Grabowski, and my brother Eric Grabowski. I am also grateful for the endless encouragement and good cooking from my mother-in-law Gail Peterson, and the clever tunes and good-natured ribbing from my father-in-law Jim Peterson.

It's a wonder I was able to get any writing done at all considering the varying needs of our family's animals, whose constant interruptions ensured I took many screen breaks and enjoyed countless walks around our beloved "field path." To Sweep, Maple, Poppy, and Percy your unconditional love and affection reminded me over and over again the power and impact the natural world has on our wellbeing.

To the joys of my life, Ellis and Pippa, words cannot begin to express how grateful I am to be your mother and for all of your love and support throughout this process. Your beautiful pictures, steady stream of questions, check-ins, and hugs, and that moment of pure happiness when I finished writing and we could *finally* have our ice cream celebration, will forever remain in my heart.

Finally, to my husband, Jon. Thank you for your creative tactics in keeping the kids busy so I could write; you clearly hold the record for the most books ever read out loud to children. You are the heart of our family and, like most things in my life, I could not have gotten my thesis over the finish line without your unending love and support. Thank you for your gentle and steady words of encouragement and for this beautiful life we have built together.

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1 | INTRODUCTION

A Note About COVID-19

When working on my thesis, my focus has been on current trends in adolescent technology use and the effects researchers and medical experts are seeing on adolescent development and wellbeing. In 2020, these trends (teens and tech use and adolescent wellbeing) were affected by the COVID-19 pandemic, which upended the daily routine and life for many adolescents in the United States. The pandemic transformed the way teenagers functioned both academically and socially. For many students their school year came to an abrupt halt when schools closed, forcing them to learn from remote classes, worksheets mailed home, or nothing at all; little in person contact with friends and family outside the home; and extracurricular activities, such as athletic and performing arts practices eliminated.

Though daily use of technology for adolescents has changed quickly and dramatically during the pandemic, there is still value in continuing my thesis as originally intended. The patterns and behaviors of teens and technology prior to COVID-19 are important to document and examine because it is the foundation, or platform, from which they've been launched into their new normal way of living in a global pandemic.

Though research is still emerging on the impact of the COVID-19 pandemic on the health and wellbeing of teenagers, my firsthand experience living and working at a boarding school during the height of the pandemic gave me insights and anecdotal observations that brings front and center everything I'd been researching prior to the pandemic. This is an important and historic time for the world, and there will be essential information to record, document, and examine on adolescent development and wellbeing. The focus of this academic work is a blend of teens and

their tech use before and after the COVID-19 pandemic, though studies are just beginning to emerge on the impact of the pandemic on adolescent tech use and wellness.

One of my first jobs after graduating from college was living and working at a boarding school in Connecticut. Nestled in a quiet and beautiful tobacco farming community, the school's stately brick buildings stood as pillars of the historic downtown. Like many independent schools in New England, the majority of students lived in dormitories, with faculty serving as dorm parents, teachers, advisors, and coaches. Those who did not live at the school lived in neighboring towns and were part of the fabric of the day to day, allowing the school's community to feel tight knit and caring. The school's students hailed from all over the world with a rich diversity of cultures, races, gender identities, and religions.

My primary role at the school was part teacher, part admissions counselor. This meant when I wasn't in the classroom, I interviewed families on Wednesday and Saturdays when there was an overflow of family visits and inquiries. All of the members of the admission office had the same polished pitch, which we used to sell our school to prospective students and their families. I was no different and could recite in my sleep the pillars of what made the school unique. One of its biggest markers was its academic technology department. At the time, the school was one of the first in the country to require every student to have a MacBook computer. In the early 2000s, this was a huge selling point to students and their families. Being fluent in computers--the Microsoft Office suite of Excel, Word, and PowerPoint--and the Internet gave adolescents an edge in academic and future professional skills and development.

Students at the school would regularly sit in the hallways of academic corridors shoulder to shoulder with their laptops open. They may have been Instant Messaging or sharing funny images they found on the internet, but they were mostly talking about a homework assignment or paper they were working on. There was eye contact, emotional exchanges, and breaks from looking at the computer screen. Often, their written work would be stationed next to their outstretched legs, such as a rough draft or an outline that needed to be transferred from paper to digital copy. While all of this was happening, music generally played from the computer as iTunes wheeled through a favorite playlist.

This was a common scene, but no more common than students playing frisbee in the quad, watching a movie together on the big screen television in the student lounge, or talking excitedly with one another in the dining hall around tables crammed with friends. Though everyone at the school was required to have a computer, it mostly made its appearance during academic hours, for academic use.

For the most part, students at the school seemed overwhelmingly happy; they regularly attended performances and athletic events to support their classmates, there were few instances of rule breaking or substance use, and the school had low attrition. I was struck one day when my advisee asked me for a meeting because she wanted to share some personal news. We sat together in my classroom and I could tell Brady was nervous; she gazed downward at her hands as they quietly rested on the table. I could see the rise and fall of her shoulders as she took slow steady breaths, and I waited for her to tell me what seemed impossible to say.

As a new ninth grade day student from an affluent, picturesque neighboring town, Brady was still working on her confidence and connections at the school. She came from a family of professionals; her mother a high level attorney for a world famous company and her father a

successful visual artist--who both grew up in New England. Though her parents divorced when she was six and her father had since remarried, her family remained close and spent hours together visiting Brady's sister who lived nearby in an assisted living facility or summering at their shore home in Rhode Island.

Brady had most recently come from an independent day school, which she had attended since kindergarten. Though she liked it there, she was eager for a change of scene as she embarked on high school. Brady was eager to make new friends, and the start of new school wasn't going as she had planned. Normally an outgoing and confident young woman, Brady found herself in unfamiliar territory, struggling with self esteem and body image issues. Being a new day student also made it difficult for her to connect with her peers outside of the classroom, or off the field hockey field, for while she was making the twenty five minute trip back home, her classmates bonded in the dining hall or dormitories.

After feeling low for a few weeks, Brady shared with her parents what she was going through and they scheduled an appointment with her pediatrician. It was during her visit with the doctor that Brady shared she had had other dips with feeling down since seventh grade. In consultation with Brady and her parents her doctor decided to prescribe Brady an antidepressant and regular counseling.

As Brady shared her story with me about her most recent diagnosis of depression, I was struck by her openness and bravery to talk about such a personal struggle. In 2005, she was the first person in my life to share that she was depressed and seeking help to feel better. I remember feeling worried about Brady and wondering if she would be okay. As if reading my mind, Brady went on to explain why she chose to share her news with me; after talking to her doctor, her therapist, and her parents, they all agreed that the best way for Brady to feel better was to make richer, more

meaningful connections. They all felt that through these connections, Brady would not only begin to feel better, but also that the people she trusted with this news would be a support network for her on her journey to feeling happier--a cheering squad so to say. And everyone was right--as soon as I heard Brady's news, I immediately wanted to help her feel better; the plan was well in motion.

Some of the standout features of the school were its leadership program and for connecting students with nature. As a teacher in the leadership department and as the school's Green Dean, my work was intimately connected with both these initiatives. To help ensure the growth and success of these programs, I worked with other stakeholders at the school to identify ways to get more of our students outside and to increase their commitment to environmental sustainability. With these commitments as a driver, one way we were able to ensure students would have more meaningful developmental experiences outside was by applying for and being awarded a grant to build high and low ropes courses at the school. This outdoor facility was used for student leadership training, team building for athletic programs, group bonding for new students, and by the student outdoor team. The second way we expanded student access to nature was by reimagining the school's leadership curriculum and adding an environmental stewardship program for all 11th graders. This program required students as a class to identify an environmental need on campus that they could take on as an eight week project from start to finish. Projects included building a wetlands boardwalk and overlook, removing invasive plant species, river clean up, and trail rehabilitation.

Being young and new to working in boarding schools, I did not have a deep well of professional experience to understand that not all independent schools had such a commitment to helping students identify their own leadership abilities and to getting students outside and connected to

nature. The vision for these two connections came from the director of the leadership department, and though I did not have the academic experience to fully understand the “why” in which these two pieces were important, my own childhood background of growing up on a farm and spending my days playing outside, gave me enough of an understanding to know that for most kids, playing outside made them happier and healthier, which I felt could be transferred to my own students. My academic understanding of the importance of connecting kids with nature wouldn’t come for another ten years, along my continued professional path of supporting adolescents in independent schools.

Though I didn’t know it at the time, moments such as those I experienced in my varied roles at the school would shape my trajectory and work in the independent school world. They would be the starting blocks to which I would measure student behavior and wellbeing. The school that helped launch my career would also help launch my understanding of how schools and students have changed over the past nearly two decades, and how this information informs my work as a practitioner in supporting student development. Now nineteen years later as an administrator at one of the largest boarding schools in the country, I continue to reflect and to better understand the changes I’ve observed during my career. It is through these moments of contemplation that I’ve come to identify three notable trends in student wellbeing.

The first is the relationship students have with their technology. Today’s teenagers have access to and use their personal electronic devices nearly constantly. Whether in the dorms or the academic buildings, on the fields or on the stage, walking between classes or grabbing a bite to eat in the dining hall, personal electronic devices have become more portable, more personalized, and more significant in the lives of teenagers. For nearly two decades, I’ve witnessed the trends of teens and their tech use as an independent school educator, and research studies confirm my observations. A 2022 study from the Pew Research Center found that 98 percent of teens (15-17

years old) say they have access to a smartphone, while 46 percent say they are online “almost constantly.”¹² For most teens, their personal electronic devices are their ticket to social connections with their peers by virtually connecting them with others through apps such as Snapchat, Instagram, Youtube, and TikTok, sending text or video messages with programs like WhatsApp, or engaging in online gaming.

The shift over the years from watching teens have meaningful in person interactions throughout the day to observing them sitting together silently staring down at their screens left me with an uneasy feeling. How is it that as educators we’ve been able to sit back and allow our students to go from holistic meaningful in-person experiences with their peers to becoming more and more isolated using their personal electronic devices? It was with this question that I began my own personal exploration to better understand the relationship between adolescents and technology and how I may be able to use my findings to better support their development.

While on this journey, I came across a book titled *The Teenage Brain* by Frances E. Jensen with Amy Ellis Nutt, which weaves together analysis of research data with anecdotal stories told by the author from her years as a clinician, researcher, and renowned neurologist. Jensen’s work allows readers to learn about and understand the adolescent brain through the lens of learning and multitasking, stress and memory, sleep, addiction, and decision making.³ While reading Jensen’s work, I was struck by the simple advice she gave readers in regards to their relationship with their personal electronic devices. To summarize, she suggests that if you want to feel happier, sleep better, have more meaningful connections, and be more productive, simply put down your device.

¹ Atske, “Teens, Social Media and Technology 2022.”

² Monica, erson, and Jiang, “Teens, Social Media & Technology 2018.”

³ Jensen, *The Teenage Brain*.

Jensen's advice was so simple and yet it struck me deeply and brings me to my second observation. In addition to seeing a significant rise in tech use from my students, I had also been observing an alarming increase in physical, mental, and emotional maladies from adolescents throughout the years. The rate increase in which students reported feeling unwell, having difficulty sleeping, missing obligations, and seeking professional help for their symptoms was concerning to me. In my various professional roles, my students struggled daily with anxiety, depression, loneliness, self esteem/body image, and other related ailments. Jensen's suggestions helped strengthen my underlying hunch that there may be a relationship between the increase in time my students spent using their personal electronic devices and their increasing reports of feeling unwell.

The third notable change I've observed during my career is that while the increase in screen time has risen significantly and adolescent wellbeing seemingly declining, I have witnessed and studied a concurrent reduction in the amount of time adolescents spend outdoors. Recent studies have found adolescents spend more than seven hours a day in front of a screen, while only four to seven minutes of unstructured play outdoors.⁴ Though not a medical diagnosis, the term *Nature Deficit Disorder*--coined in 2005 by author Richard Louv-- is used to describe the trends in adolescents' wellbeing due to the decrease in time children spend outdoors and an increase in adolescent maladies such as depression, obesity, anxiety, and attention deficit disorder (ADD). Through my research I have learned how critical it is to connect adolescents with nature for full human development (physical, social, emotional, and intellectual). Further, studies have found a correlation between time spent outside and an increase in physical, mental, and emotional wellbeing.

⁴ City, "Why Kids Need to Spend Time in Nature."

Building on a growing body of literature around the intersection of technology and teens and by using anecdotal accounts from my experiences with students, my thesis examines the increase in student mental and physical illness and whether or not screen time might help explain some of these trends. Further, I wish to examine whether adding nature as an informal antidote could help combat some of the emotional and physical trends I am seeing in my students.

The themes I will focus on (for my thesis) include key areas I support students with as an educator:

1. Experiences adolescents have with technology and how their interactions and habits with screen time might impact adolescent physical development and wellbeing.
2. Concerns over an increase in physiological issues (sadness, depression, anxiety, loneliness, and suicidal ideation) in adolescents.
3. Can nature be used as a strategy to improve health & wellness in adolescents including their physical, mental, and emotional development.

With this framework, there is an overarching question that will guide the exploration of my thesis; *As a practitioner, how do I take the emerging insights around screen time and connections to nature to better empower myself, and my colleagues, to support and educate adolescents in the complex, post-pandemic, socio-digital environment of the 21st century?*

In engaging in this personal exploration, I hope my work will also provide insights that are broadly relevant and applicable to fellow educators, parents, or anyone who works with adolescents.

2 | Effects of Technology on the Physical Development & Wellbeing of Adolescents

Introduction

When our son Ellis was born in 2015, my husband and I accompanied him to his many doctor's visits during his first year. After his birth, it seemed we were traveling together as a family every few weeks to have Ellis weighed and measured, and to talk about his overall wellbeing. Nurse Jeanie would lay Ellis on the exam table, stretching our growing--and often screaming--baby to his full length before marking a spot on the crackling white paper where his head began and his toes ended. After taking a few additional measurements, Jeanie would plug Ellis's numbers into a computer, crunching the figures and spitting out his percentile for height, weight, and head circumference compared to the national average. According to the U.S. Department of Health and Human Services, babies are evaluated by a medical professional six times before their first birthday to ensure they are healthy and developing normally.⁵

As it was for our pediatrician's office, the overall health and wellbeing of children is a top priority for many cultures and countries across the world. After becoming a mother, I have a better understanding of and perspective on the journey children take with their families and healthcare providers to ensure they are thriving and meeting important health markers. As an educator, I've often thought about how I could transfer my experiences with my son and his healthcare professionals to consider the types of "health markers" I might use when evaluating the wellbeing of the students I work with.

⁵ "Make the Most of Your Baby's Visit to the Doctor (Ages 0 to 11 Months) - MyHealthfinder | Health.Gov."

Many of the students I work with live away from home, which means I'm required to wear many hats to support them. Whether as their teacher, dorm parent, coach, and advisor, it is important for me to pay attention to how they are doing both physically and emotionally. So I ask, in my profession what am I seeing and how do my observations compare with what I saw last month, last week, or even last night? As noted earlier, there is no doubt the constant and extended use of technology may be having an impact on students, but to what extent? This chapter will explore my personal experience with students to better examine and understand the effects technology use may have on their physical development and wellbeing.

Part I: Musculoskeletal Effects

One of my greatest joys as a high school field hockey coach is playing in drills with my players. Though my days playing competitive hockey are long behind me, jumping into practice or warming up goalies allows me to interact with and connect with players in dynamic and competitive ways--plus, it is also just fun.

Though I made it through high school and college without any serious athletic injuries, I was struck--both literally and physically--one afternoon when one of my players took me out while we were playing one-on-one drills during an afternoon practice. While sprinting down the field with the ball, a 10th grade student named Ivy, eager to make the varsity team, charged full speed toward me to reclaim possession of the ball. Though she had impressive speed, Ivy was still working on her breakdown steps and misread the situation. Crashing into me, Ivy knocked me over and I landed awkwardly--and painfully--on my shoulder.

Though just an unfortunate accident, the injury required months of physical therapy for me to regain full range of motion and strength of my arm and shoulder. It was during my many sessions

at physical therapy that I developed a friendship with my physical therapist Jenny. Both being mothers of young children, we talked weekly about the growth and development of our kids. It was during one of these conversations that we got on the subject of the effects of technology on infants and toddlers. It was an area I was deeply familiar with, having just begun the research for my thesis, and though my husband and I did not allow our young son to look at screens, I shared with Jenny that I was growing more and more concerned with the amount of time I'd been seeing my students spending on their devices.

As a physical therapist for the past 15 years, Jenny said she too was worried by the increase in adolescent patients she had had over the past few years and particularly for the ailments that brought them into her office. Mostly reserved for the elderly, Jenny had begun seeing teenagers who needed physical therapy for neck, back, and wrist pains, which was likely due to their habits with their technology.

I was floored by Jenny's observations, and when I got home from my appointment, I decided to see if there was any scientific research to help explain her experiences. After doing an initial internet search for "neck and back pain in teens due to phones," it became clear Jenny's observations were in fact a growing concern among many medical experts and backed by research studies. A 2016 article from UCLA Health titled *Is your teen's smartphone literally a pain in the neck?* stated, "Doctors who specialize in spine disorders report that more patients are complaining of a phenomenon sometimes referred to as "text neck" — neck and back problems caused by hunching over smartphones. "We see both back and neck pain associated with poor posture during phone use," says Langston T. Holly, MD, FAANS, co-director of the UCLA Spine Center.⁶ It appears adolescents may be more vulnerable to "text neck" as their bodies are still in critical stages of development. A 2021 study published in the International Journal of

⁶ "Is Your Teen's Smartphone Literally a Pain in the Neck?"

Environmental Research and Public Health took a closer look at the underlying causes and risk factors of musculoskeletal pain, including “text neck syndrome” in adolescents. Though they suggest a more rigorous study of musculoskeletal pain is needed to confirm a significant relationship between adolescents and technology, in their study they write:

It is estimated that children and adolescents spend a medium of 5 to 7 h a day on their smartphones and handheld devices with their heads flexed forward to read and text. It has been reported that the cumulative effects of this exposure reach alarming results of an excess stress on the cervical spine area, ranging from an average of 1825 to 2555 h a year [5].

There are several complications of text-neck syndrome. They can involve the eyes, the heart and lungs, the head, and the psychological field. An elevated number of studies all over the world have analyzed musculoskeletal pain in children and adolescents. There is now enough evidence to support the association between flexing toward the neck and symptoms referred to the cervical spine.

Children and adolescents do not take the long-term damage to the body seriously or do not know about it, probably because the short-term effects are not so noticeable. Only in adulthood can the effects of forward flexion of the neck seriously affect the quality of life. This fact must put the attention on younger people, the most frequent users of smartphones and tablets: this increase the fear that young people could face a future of pain and disability, or even worse taking years off of their life expectancy [1].

A 2022 study published in the *Journal of Health Services* titled, “The frequency of the use of information and communication technologies in school age children and musculoskeletal disorders connected with their use,” took a deeper look at the correlation between musculoskeletal pain and extended tech use in teens. The study surveyed students (ages 10-16

years old) to determine the frequency of the use of information and communication technologies (ICT)--such as smartphones, tablets, and laptops--and to examine the frequency and localization of pain during their use.⁷ Their results found that, “the pain in the last 12 months caused by ICT use was most present in the area of the neck/shoulders (42.4%), while the pain during the previous month was mostly present in lower extremities (29.1%).”⁸ Their conclusion makes it clear that, “Increased use of ICT devices related to higher levels of musculoskeletal symptoms. Higher exposure to pain in various segments of the body is a reason of concern, and further research on the implication of their use among adolescents is necessary and justified.”⁹ Though these are only a few of the scientific studies conducted to better understand the effects of tech use on musculoskeletal pain in adolescents, researchers agree more work needs to be done as this is an emerging issue world wide for children and adolescents.¹⁰

Over the last decade, adolescent technology use has increased significantly. In 2014 teen screen use (13-18 year olds) averaged 6.4 hours per day. Today, that number has increased to 8.4 hours per day in which adolescents are using electronic devices to watch online videos, use social media, play video games, or to engage with other screen-based media.¹¹ This increased use is concerning, and the COVID-19 pandemic undoubtedly played a role in accelerating the number of hours adolescents spent using technology when schools were forced to close and online classes to begin. Through anecdotal observations, such as those Jenny made in her physical therapy practice, and the research experts are finding on the correlation between the effects of frequent technology use and musculoskeletal pain teens are experiencing, a fuller and more broader picture

⁷ Lazić et al., “The Frequency of the Use of Information and Communication Technologies in School Age Children and Musculoskeletal Disorders Connected with Their Use.”

⁸ Lazić et al.

⁹ Lazić et al.

¹⁰ David et al., “Text Neck Syndrome in Children and Adolescents.”

¹¹ Rideout, V., Peebles, A., Mann, S., & Robb, M. B., “2021 The Common Sense Census: Media Use by Tweens and Teens.”

is taking shape of the consequential effects extended technology use may have on the developing adolescent body.

Part II: Effects on the Development of the Senses

While waiting in the exam room at my eye doctor's office recently, I sat back and looked around, enjoying a rare quiet moment. Models and pictures of the human eye were located throughout the room; blue and red optic nerve and retinal vessels colored enlarged posters of the human eye and pamphlets with information on glaucoma, dry-eye, and lasik surgery dappled the walls. My gaze stopped when I noticed a new type of material I had never seen in an eye exam room before. It was a large canvas wrapped sign with the word MYOPIA at the top. Below the title, stood four sections, each providing information on what myopia was and why it was important. What I learned while sitting in the exam chair, was that myopia is a term used to describe nearsightedness; a common condition in which "you can see objects near to you clearly, but objects farther away are blurry."¹² For adolescents, myopia begins between the ages of 6-14 years old, with roughly 30 percent of adolescents afflicted with the condition.¹³ The significance of this poster was not merely to educate the public on adolescent nearsightedness, but rather to share emerging research on how medical experts are seeing a significant increase in the number of people—especially children—being diagnosed with myopia. The poster ended with simple advice on ways to combat behaviors that may lead to myopia, which include looking away from the screen every 20 minutes, 20 feet away, for 20 seconds. When Dr. Kumar came in, I shared with her my surprise by the myopia sign in the room and I asked if she would be willing to tell me more about it. She went on to explain that medical experts believe there is likely a correlation

¹² "Nearsightedness - Symptoms and Causes."

¹³ "Myopia (Nearsightedness) in Children."

between the increase in time adolescents spend using their personal electronic devices and the rapid rise of myopia in children.

A 2020 study from *Acta Ophthalmologica* titled, “Low physical activity and higher use of screen devices are associated with myopia at the age of 16-17 years in the CCC2000 Eye Study,” supported the information shared with me by my ophthalmologist. The study, which surveyed 1443 Danish participants between the ages of 16-17, found that, “In this cohort of healthy 16–17-year olds, lower physical activity and more use of screen devices contributed significantly to the observed 25% prevalence of myopia with a roughly doubled risk of having myopia if physically active <3 hr/week or if using screen devices >6 hr/day. Our results support physical activity being a protective factor and near work a risk factor for myopia in adolescents.”¹⁴ This study suggests that adolescents who spend less than three hours a week being physically active or if they use screen-based technology more than six hours a day, were roughly doubling their risk of being nearsighted.

As we moved through my eye exam, I shared with the doctor my profession and how my experiences as an educator sparked my interest in the effects of technology on adolescent development and wellbeing. She went on to tell me that while the rate increase of myopia in adolescents is concerning, additional studies have suggested that increasing the time children and adolescents spend outdoors can be a simple way to reduce the risk of developing myopia and/or slowing the progression.¹⁵ While this news was in fact heartening, I couldn't help but feel a sense of worry knowing that recent trends in the amount of time children and adolescents spent outside

¹⁴ Hansen et al., “Low Physical Activity and Higher Use of Screen Devices Are Associated with Myopia at the Age of 16-17 Years in the CCC2000 Eye Study.”

¹⁵ Sherwin et al., “The Association between Time Spent Outdoors and Myopia in Children and Adolescents.”

had decreased significantly over the years (which may be one of the reasons myopia is on the rise) and that I did not share her optimism.

When the exam was nearly finished, the doctor went on to discuss the different types of lenses I could use in my glasses. In light of our conversation, she suggested I consider using a new type of lens that had a “power boost” of blue light blocking technology located at the bottom of the lens and was specially designed for looking down at handheld devices, which are often held closer to the eye. The light emitted by these devices is a type of light called “blue light,” which in large doses can negatively impact parts of the body such as the eyes and brain (more on this later). Though I did not feel my personal tech habits made me an ideal candidate for the specialized lens, I did make a mental note that I wished glasses with protective features, such as the “power boost,” could be required for students in the same way computers, laptops, or iPads are at many of the institutions I’ve worked for because this feature could have a protective feature on their eye development.

After my conversation with Dr. Kumar, I couldn’t help but think about the struggles one of my advisees, Chris, had with chronic headaches and migraine. Chris was a repeat 10th grade student from the mid-Atlantic, who was a promising blue-chip ice hockey player. He recently came to my school after spending two years enrolled at an ice hockey academy where he skated and practiced during the day and took online classes at night. Until Chris came to my school, he had not physically been in a classroom since his 8th grade year and as he later shared with me, he spent those two years living with a host family in their basement.

It was clear Chris felt insecure and out of place coming to a boarding school in Massachusetts. He confided in me that he did not feel smart enough to be at the school and often called himself “stupid.” Chris firmly believed the only reason he was accepted to the institution was because he

was a good hockey player and he felt enormous pressure to perform at a high level not only to preserve his scholarship for the following year, but also so he could secure a recruiting spot for a standout division I program.

Chris was smaller in size than most high level college ice hockey recruits but he worked hard to build muscle mass and to be one of the quickest players in the school's most recent memory. In fact, Chris was one of the hardest working students at the school—an attribute that would serve him well as he reintegrated into an in-person classroom setting and adapted to the academic demands of a rigorous academic program. Though it seemed Chris would have many traits that might make him a popular student, his lack of social connections from his last few years living with a host family and attending school online made it so he was behind his peers in building social and emotional skills. He was intense in every interaction, making it seem as though he was always on the defensive. A simple check-in about how classes were going could quickly pivot and become a conversation about how much he hated school and how he was only there to play hockey.

It was often this mindset and lack of confidence that made it difficult for Chris to sit in social settings with students not in his immediate friend group. Each week, my advisory group gathered to spend time together to discuss upcoming events or to share an activity or sweet treat. Though Chris lived in the same dorm as the other seven members of the group, he had difficulty connecting with the other students; he rarely added to our conversations and often sat away from the others with his head down, looking at his phone. Even after multiple attempts to encourage Chris to join us, Chris remained unable and unwilling to connect with us in this way.

Perhaps it was Chris's first two years of high school, living away from home and solely focused on hockey, when he developed his tech habits. His online school required him to use

screen-based, technology and the only way for him to connect with his family and friends back home was also to use electronic devices. In my conversations with Chris, he did little outside of school and hockey and often spent his free time in the basement aimlessly scrolling social media and Youtube for hours on end.

It quickly became clear after observing Chris's day to day experiences that he used his cell phone almost constantly. His teacher comments regularly cited that he was on his phone during class lectures and discussions, even after being told to put his phone away, and though Chris knew his phone use was negatively affecting his grades, he still continued to use it. Chris also used his phone during the "in between times" that happen at boarding schools such as eating meals in the dining hall, working out in the gym, and hanging out with friends. For the three years I was Chris's advisor, I can't recall a single time I did not see Chris without his phone.

Though Chris's phone habits were not uncommon for adolescents, I also became aware that Chris struggled with headaches and migraines since middle school and was at the point where he sought treatment from his pediatrician and a neurologist. Though there can be many underlying causes of headaches and migraines, and Chris was seeking professional care for his ailments, I couldn't help but wonder if Chris's tech habits might be contributing to, or in the very least not helping to improve his chronic pain?

When thinking back to my conversation with Dr. Kumar, part of the reason she advocated adding the power boost lens to my glasses was to reduce the amount of close blue light exposure for my eyes. However in connecting my conversation with my ophthalmologist and my observations of Chris, I wanted to dive deeper into understanding the role screen time may have on headaches.

Though the research remains inconclusive, some believe a potential benefit to blue light blocking glasses is that it may help with eye fatigue when looking at screens. Since many screen-based technologies are designed to hold a person's attention for extended periods of time, a person's eyes can be exposed to large doses of bright light. Prolonged exposure can lead to eye strain due to screen glare and brightness, viewing too close or too far away, poor sitting posture, or underlying vision issues.¹⁶ Those affected by digital eye strain may experience symptoms such as blurred or double vision; eye discomfort including burning, stinging, and dryness, as well as neck and back pain and headaches.¹⁷ Though a 2021 study from the *American Journal of Ophthalmology* concluded "Blue-blocking lenses did not alter signs or symptoms of eye strain with computer use relative to standard clear lenses," computer users argue the opposite and claim they experience less eye fatigue and headaches when using blue light blocking lenses.¹⁸ In fact sales of blue light blocking glasses doubled during the pandemic as a way for users to get relief from symptoms related to eye fatigue.¹⁹ Some vision experts argue it might boil down to personal preference; if the user sees a difference or improvement in their symptoms, that is all that really matters.

Chris may have been experiencing digital eye strain from his near constant cell phone use, which may have contributed to his frequent headaches and migraines. Though I am not a medical expert and would not have the expertise to make any diagnoses, medical experts agree that extended screen-based technology use can lead to eye strain for any individual, which could be a contributing factor to Chris's chronic headaches.

¹⁶ "Negative Effects of Technology."

¹⁷ "Computer Vision Syndrome: What Is Digital Eye Strain?"

¹⁸ Singh, Downie, and Anderson, "Do Blue-Blocking Lenses Reduce Eye Strain From Extended Screen Time?"

¹⁹ N, P, and R, "Do Blue Light Blocking Glasses Really Work?"

My research also led me to a journal article which examined the specific impacts of screens on headaches in adolescents. A 2021 review in the *Journal of Annals of Indian Academy of Neurology* titled, “Electronic Screen Exposure and Headache in Children,” discussed the effects of electronic screens on headache in adolescence to underscore the significance of screen exposure in children with this condition. Their research found “An association was noted between excessive use of electronic devices and the presence of headache in adolescents (14 to 19 yr). This habit is considered a risk factor, especially for the development of migraine-type.”²⁰ What was also interesting about their findings was that adolescents “with both migraine and episodic tension-type headache used computers more often than children without headache.”²¹ When thinking about how this information might be applied to my observations of Chris’s behaviors, I couldn’t help but come back to the endless minutes Chris had used his cell phone in my presence over the years. Could his chronic headaches be exacerbated by his excessive tech use? Or, was it that Chris’s regular migraines made him more prone to using his cell phone more often than most teens? Whatever the case, it seems likely that Chris’s screen use is not helping to improve his condition and may even be making it worse.

To support students like Chris, I will discuss policy changes schools may want to consider implementing regarding their students’ technology use. However, for this specific scenario, the “Electronic Screen Exposure and Headache in Children” article provided suggestions that may be helpful for individuals who experience chronic headache and migraine episodes. The article suggests “that children with primary headache should be evaluated for abuse of electronic screens. Many children with primary headache are associated with abuse of electronic screens.” and also “Limiting the time spent on the screen is important for the reduction of headache symptoms of children and adolescents.”²² At Chris’s school, this could look like an initial

²⁰ Caksen, “Electronic Screen Exposure and Headache in Children.”

²¹ Caksen.

²² Caksen.

evaluation at the school's medical center for excessive technology use and working with Chris's primary adult support team (including his family in Pennsylvania) to set limits and boundaries for his electronic screen use to see if his symptoms improve.

With more and more adolescents spending long hours looking at screens, medical experts and researchers are beginning to unearth the potential negative impacts this may have on eye development and vision. Though more research is needed to better understand the potential long term effects of chronic eye fatigue on adolescents, the data is conclusive that childhood myopia is on the rise and that more and more teens are complaining about symptoms related to eye strain, such as headaches, than they did ten to fifteen years earlier. Though Chris's story is multifaceted and there isn't a single explanation for his regular migraines, he is just one example of the students I have worked with during my career who may have been impacted in negative ways by extended periods of time spent on a cell phone or similar electronic devices.

Part III: Sleep Disruption & Effects

While I was sitting in my office one morning, the hallways slowly began to fill with students leaving their first period class. Soft murmurs quickly gained momentum as friends and classmates saw one another in passing before ducking into their next class. As I sat at my desk, plowing through the myriad of emails, I casually glanced up and noticed Andréa standing tentatively outside my door. "Are you busy?" she asked. "No, no, Andréa. Come in. It's good to see you," I answered. "How are you?"

Over the years of working with adolescents, I've found it takes courage for students to reach out to an adult for help. During adolescence, students often look to their peers as their first line of support but if the problem is bigger than the advice they get from their friends, students will often

turn to a trusted adult. This is why whenever a student stopped by my office to talk, I put down what I was doing to hear their concerns.

As I asked Andréa if she wanted to sit down, I noticed the gray shadows under her eyes, the lack of color in her cheeks, and the way she held her arms tightly wrapped around her chest. She did not look well and I asked if she was feeling all right. In my conversation with her, I learned she was having challenges with her roommate. Andréa was a new 9th grade boarding student from Mexico, and though she and her family had traveled extensively, this was her first time living away from home and in another country.

Andréa went on to tell me that for days now, she has been having difficulty sleeping. Though she would get ready for bed at 10:30pm, it took her a long time to fall asleep. When she finally fell asleep (around midnight), her roommate's phone would wake her up with incoming notifications, or her roommate would be up talking to friends until one or two in the morning. When she was finally able to fall back asleep around 4 a.m, she then had to wake up at 7:30 a.m. to be ready for her first period class. In addition to feeling exhausted, Andréa also was having headaches and nausea.

Since Andréa had not had time to have breakfast that morning, we decided to take our conversation to the dining hall for a cup of tea and a raspberry muffin. As we sat at our table, each with a mug of chamomile, I learned more about Andréa's life prior to coming to a boarding school. She was the oldest of four girls and spent most of her time living in their apartment in Mexico City. Though her parents were both busy with their careers--her mother a wellness and yoga instructor and her father an international financial advisor--she felt close with them. Being the oldest, Andréa felt the pressure to set a good example for her younger sisters to follow and this included waiting until she was thirteen years old to get her first cell phone. Andréa had only

had her iPhone for one year prior to going away to boarding school. Her parents felt it would be good for her to get used to it before being away from home.

I asked Andréa to tell me more about her relationship with her phone. I knew, having worked with hundreds of students prior to my conversation with her, that thirteen was actually a later age than when most of my students got their first phones. It was a question I'd wondered about for years (after seeing more and more students glued to their devices) so I often asked my students in class. Many of them received their first cell phones at age nine, ten, or eleven. I would occasionally get the one student whose parents waited until they were thirteen or fourteen.

Though at home Andréa had a phone, her parents had rules for when and how she could use it. This included a limited data plan, not having her phone in her room at night, and allowing her parents to monitor her social media accounts. Now that Andréa was living away from home, her parents hoped the habits she developed with her smartphone would carry over to her experience at boarding school. And while for the most part they had, Andréa was subject to the influences of both her friends' use (including her roommate) and the fundamental design of both the technology itself—specifically the design of social media apps (more on this later).

Since coming to boarding school, Andréa's time with technology significantly increased from her experiences while home in Mexico. Though Andréa's roommate's late night technology use indeed affected her sleep, her roommate's use was only one piece of the puzzle that could have contributed to Andréa's overall poor wellbeing. Since arriving at school, Andréa slept with her phone on her desk that sat adjacent to her bed. This was so Andréa could hear her alarm in the morning and so that when she was awake in the night (whether waiting to fall asleep or after being woken up by her roommate), she could look at social media sites until she felt sleepy again.

Andréa's boarding school required each student to have an iPad with them for classes and to use technology for both accessing and completing homework through an online classroom suite. Though students were not allowed to use their phones during class, Andréa and her classmates always carried their phones on them, hoping for a quick peek at their screens when the teacher was not looking to check notifications or to post a selfie to a social media app.

Andréa's screen use went from a few hours a day to many hours a day, seemingly overnight. While home in Mexico, Andréa attended a Catholic school that had strict rules regarding cell phone use during the school day. Her classes were also instruction based, which meant they learned most of their material from lectures given by their teachers and students took notes by hand; there was no need for them to use their laptops or tablets during class. Teachers also delivered homework assignments verbally at the end of class, so there was not an online classroom for students to access additional classroom material such as assignments, handouts, or videos. The technology differences between Andréa's former school and her current school were some of the reasons why Andréa chose to attend a boarding school. She and her family liked the idea of a more enriching classroom environment where classes had a robust technology curriculum built in. Andréa's family liked the idea of her being able to access her homework assignments online, as she was known to be disorganized at times, occasionally losing handouts or forgetting to write down assigned problem sets. Further, Andréa's parents were hoping a school with a more advanced technology program might help Andréa foster a love for STEAM (science, technology, engineering, art, and mathematics)--a field they hoped she might pursue in college.

Now living away from home, with few limits on her technology use, Andréa's daily experiences were saturated with screen time. From the moment she woke up (smartphone alarm) to the moment she fell asleep (smartphone social media sites), Andréa engaged readily with her personal electronic device.

As I sat listening to Andréa, it was clear she was feeling overwhelmed and unsure how to navigate this difficult experience. Andréa felt if she could sleep each night consistently, she would start to feel better again. Though sleep is a critical component to overall wellness at any age, the adolescent brain is particularly affected by sleep for it is one of the most critical growing periods of brain development.²³ For days now, she was not getting enough sleep and felt exhausted and nauseous, and had a headache as a result. I could also add, after spending an hour listening to her, she felt sad, had trouble concentrating, and did not want to engage in the activities she was once excited about (such as her classes, sports, and social activities). At one point in our conversation, Andréa mentioned she was even considering leaving school to return home to Mexico.

Andrea's personal observations of her sleep patterns were helpful to understand what she is feeling and why; unfortunately, it may not have been the only cause of some of her ailments. For example, many teens have difficulty falling asleep and often do not begin sleeping until around midnight. Research shows that during the adolescent period, teen sleep patterns are disrupted and shift toward staying up later.²⁴ This means, in order for adolescents to get the eight to ten hours of sleep they need each night, their bodies prefer to wake up later. This is often an indicator for many families that their child is entering adolescence. They seemingly want to stay up until all hours of the night and sleep until afternoon the following day. If Andréa was falling asleep around midnight and waking up at 7:30 a.m. for her first period class, she would be averaging around seven and a half hours of sleep per night, which is below the number of hours (eight to ten) recommended for teens each night.²⁵ With the disruption of sleep by her roommate, Andréa was likely getting closer to five hours of sleep each night; almost half of the number for her optimal growth and wellbeing.

²³ CSA - Digital book

²⁴ Add footnote here on adolescent sleep patterns

²⁵ "Sleep in Middle and High School Students | Healthy Schools | CDC."

Though this shift in the adolescent sleep cycle is well known, research is uncovering the ways screen time, such as use immediately before bed, may be affecting natural adolescent sleep patterns. Even before the development of the iPhone or tablet, artificial light had been part of our daily lives and played a significant role in altering our natural sleep patterns. Light, more than any drug, affects our natural circadian rhythms. One of the biggest obstacles for sleep after using screen-based technology, is that most screen light utilizes blue light in particular. Blue light has been shown to arouse the brain and suppress melatonin, which is a natural hormone released from the brain when the light darkens and the body unwinds for sleep. Harvard researchers conducted a study that examined the effects of blue and green lights on the production of melatonin. What they found was that after six and a half hours of exposure to blue and green lights at similar brightnesses, the blue light suppressed melatonin twice as long and shifted the natural circadian rhythms twice as much as the green light (three hours vs. one and a half hours).²⁶ A 2014 study in the journal of *Sleep Medicine*, found that weekday users of technology just before bed—specifically mobile devices, video games, and social media—suffered the greatest difficulty in falling asleep.²⁷ In addition to delaying the time a person might naturally fall asleep, research also found the quality of sleep may be affected as the result of prolonged exposure to blue light. As blue light affects the natural circadian rhythms, or the process by which the body sleeps and wakes up, the quality of sleep decreases.²⁸ This can include frequent night wakings and sleep walking.²⁹

²⁶ Publishing, “Blue Light Has a Dark Side.”

²⁷ Arora et al., “Associations between Specific Technologies and Adolescent Sleep Quantity, Sleep Quality, and Parasomnias.”

²⁸ Health, “How Does Blue Light Affect Sleep?”

²⁹ Arora et al., “Associations between Specific Technologies and Adolescent Sleep Quantity, Sleep Quality, and Parasomnias.”

Though a few disturbed nights of sleep can have negative short term implications, for adolescents an ongoing lack of sleep over an extended period of time is cause for concern and may impact their physical and emotional wellbeing. Researcher, professor of psychology, and director of the Massachusetts Aggression Reduction Center Elizabeth Englander writes, “Insufficient sleep during childhood and adolescents is associated with poorer academic performance, physical difficulties (such a weight gain), emotional difficulties, trouble with social relationships, and a slew of other problems.”³⁰ A 2020 study published in the the *Journal of Current Opinion in Physiology* found that for teens, one of their biggest barriers to sleep is their electronic media use. The study goes on to state, “Night-time electronic media use in this age group has been shown to significantly associate with later bedtimes, shorter sleep durations, increased self-reported feelings of being ‘stressed’ at school and higher self-reported sleepiness in the classroom.”³¹ The article also cited a study that found boys typically use electronic media for gaming and video watching, whereas girls mostly engage with their mobile phones. Some females even reported feelings of stress and anxiety if they were not allowed to keep their mobile phones with them in their bedrooms during evening hours.³²

The impact screen use has on adolescent sleep, particularly use before bed, can have a “snowball” effect on the physical wellbeing of teens. From a later time when adolescents fall asleep, to a poorer quality of sleep, to chronic exhaustion, problems with memory and processing, weight loss/gain, headaches, nausea, irritability, difficulty with social relationships, and more, these health challenges are very difficult to navigate long term. For some of my students, these chronic conditions happen everyday.

³⁰ “Technology and Sleep Deprivation Affect Teens.”

³¹ Sharman and Illingworth, “Adolescent Sleep and School Performance — the Problem of Sleepy Teenagers.”

³² Sharman and Illingworth.

Before Andréa came to boarding school, she had breaks from her personal electronic device at school and at home, especially during the evening and bedtime hours. At boarding school, Andréa did not have this same space away from her device, and even when she tried to take breaks from her cell phone, she was unable to control her tech use on her own; she simply could not have her phone around her and not use it. Though Andréa received support from the school to help her with her roommate issues, she ultimately left the school later that year due to symptoms of depression. For Andréa and her family, it was important for her to return home and to have the support of her family while she sought treatment and recovery. Before I said goodbye to Andréa, her mother Isa and I talked at length about Andréa's tech use habits. She was also concerned about the effects of Andréa extended cell phone use and would be putting back in place the boundaries and limitations Andréa had last year. We also talked about sharing this information with Andréa's therapist and pediatrician so they could help support Andréa and her family with resources on what healthy screen time looked like at each developmental stage.

Part IV: Brain Development, Feedback Loops, & Addiction

Though Andréa's story is just one example of a student struggling while attending boarding school, she is one of dozens of students I have worked with who have faced similar challenges. In my various roles as a student life administrator (e.g. dean of students), I've worked daily with students struggling with difficulty sleeping, feeling disconnected, sadness, worries, and other related maladies. The rate of increase that students report feeling unwell, missing obligations, and seeking formal and informal help for their symptoms is concerning. I've long asked myself, what has changed from 2004 to 2023 during my time working in independent schools? One answer I keep coming back to is personalized electronic devices (i.e. smartphones) and the speed at which technology is advancing.

According to a 2022 study by the Pew Research Center 97 percent of all teenagers have, or have access to, a smartphone.³³ This number is a notable increase when compared to the same study ten years earlier in which 31 percent of teens owned cell phones.³⁴ During the past 13 years (since the introduction of the iPhone, and later other smartphones), the device features have become more advanced and sophisticated. The original operating system of the first generation iPhone (2007) seems archaic compared to today's standards and included features such as placing and receiving phone calls; accessing the internet using a 2G network, taking photos, making videos, and using a screen-based texting system to send messages.³⁵ Since then, smartphones have become much more advanced with high resolution camera lenses and screens; larger storage capacity; longer battery life; and faster processing speeds. They can now be waterproof, dustproof, and shatterproof. They run on 4G or 5G networks, come in dozens of colors, and support thousands of apps. Over the years, cell phones have become easier and faster for users to access and use multiple high quality platforms anywhere in the world.

This same 2022 Pew Research Center study also cited that almost half of all teens (47 percent) report they are online "almost constantly," which is almost double to what was reported in the 2014-2015 survey (24 percent).³⁶ In an article published in *Child Development* by Madeleine J. George, et. al. looking at the potential negative effects of technology on adolescent mental health, the authors cite the average teen spends, on average, nine hours a day using screen-based media, including three hours a day on their mobile phones.³⁷ But what exactly are kids doing online? Eighty-five percent of adolescents report using social media, with the most common platforms being YouTube (95 percent), TikTok (67 percent) Instagram (62 percent), Snapchat (59 percent),

³³ Atske, "Teens, Social Media and Technology 2022."

³⁴ NW, Washington, and Inquiries, "Cell Phone Ownership."

³⁵ "What Can I Do With a First-Generation iPhone?"

³⁶ Atske, "Teens, Social Media and Technology 2022."

³⁷ George, Madeleine, et al. - Concurrent and Subsequent Associates Between Daily Digital Technology Use and High-Risk Adolescents' Mental Health

and Facebook (51 percent), with most teens using more than one social media site.³⁸ Another aspect of teen screen use is their constant need to communicate virtually--a typical teen sends and receives roughly 167 text messages per day. The number of teens who have access to a mobile device coupled with the amount of hours adolescents spend connecting virtually supports the labeling of “always on.”³⁹

Mobile devices accompany adolescents in almost every facet of their lives. As an observer of this behavior, I can’t help but wonder what it is that keeps teens glued to their cell phones--what is the draw, the hook, and the desire for adolescents to be continually plugged into a virtual world? To help answer this question, researchers have looked at the effects screen use and social networking sites have on the developing brain.

Over the past twenty years, exciting research has come out regarding the adolescent brain and how this period of development, particularly for cognitive growth, rivals the more commonly known brain development time of the early childhood years. Researchers are learning that during the adolescent years (puberty through mid-twenties) the brain is remodeling--pruning to become more efficient, while also having a heightened awareness of senses and emotions, specifically:

Over the first few years of life, the brain grows rapidly. As each neuron matures, it sends out multiple branches (axons, which send information out, and dendrites, which take in information), increasing the number of synaptic contacts and laying the specific connections from house to house, or in the case of the brain, from neuron to neuron. At birth, each neuron in the cerebral cortex has approximately 2,500 synapses. By the time an infant is two or three years old, the number of synapses is approximately 15,000 synapses per neuron (Gopnick, et al., 1999). This

³⁸ Atske, “Teens, Social Media and Technology 2022.”

³⁹ Kardaras, *Glow Kids*.

amount is about twice that of the average adult brain. As we age, old connections are deleted through a process called synaptic pruning.

Synaptic pruning eliminates weaker synaptic contacts while stronger connections are kept and strengthened. Experience determines which connections will be strengthened and which will be pruned; connections that have been activated most frequently are preserved. Neurons must have a purpose to survive. Without a purpose, neurons die through a process called apoptosis in which neurons that do not receive or transmit information become damaged and die. Ineffective or weak connections are "pruned" in much the same way a gardener would prune a tree or bush, giving the plant the desired shape. It is plasticity that enables the process of developing and pruning connections, allowing the brain to adapt itself to its environment.⁴⁰

This remodeling period may also be the underlying cause of why teenagers are more prone to risk taking, impulsiveness, and pleasure seeking. The pruning period begins at the back of the brain and works its way to the front. The prefrontal cortex is located at the front of the brain (right behind the forehead) and it is the part of the brain used for decision making. Since this is the last part of the brain to develop, adolescents are at a disadvantage for decision making when compared to the fully developed brain of adults. Clinical psychologist and adolescent tech-use expert Dr. Catherine Steiner-Adair writes, "We know now that it takes twenty-five-plus years for the prefrontal cortex, the part of the brain that enables us to link consequences to behavior (called executive functioning) to fully develop. In the adolescent brain, executive functioning is still a work in progress, neurologically not yet a fully functioning piece of a teen's decision-making process."⁴¹ This is why when a teenager makes a poor decision and an adult asks, *what were you thinking*, the answer almost always given is, *I don't know* or *I wasn't*. For the teenage brain, this is

⁴⁰ "Neuroscience for Kids - Brain Plasticity."

⁴¹ Steiner-Adair, *The Big Disconnect*. (p. 37)

actually true; a teen’s impulsive nature and underdeveloped prefrontal cortex makes it so that they in effect are *not* thinking when they made a poor decision.

Personalized electronic devices have been designed and built to exploit adolescent impulsiveness, their high desire to seek pleasure, and their propensity for risk-taking behavior. Teenagers are not physically able to stop using their phones, even if they fully know the consequences of their behavior, without adult intervention. Their constant need to check for notifications is impulsive and subconscious. Dr. Steiner-Adair argues, “So it [a teen’s decision making process around tech use] falls to us. Older and ostensibly neurologically wiser, we are the ones equipped to think of consequences. At times, though, our own love affair with tech clouds our view of the serious consequences the same habits hold for our children...Research and behavioral trends already show that when tech becomes an early and continuing presence in children’s lives, it can undermine family and child development...Psychologically, these losses in fundamental aspects of child development and well-being can set our children up for trouble in school and life.”⁴² It is essential that the caregivers of adolescents step in and establish parameters around their child’s tech use as adolescents are unable to do this on their own.

The “always on” generation may also have negative developmental consequences in those parts of the brain that are dedicated to social interactions, empathy, and other interpersonal skills. As psychologist and addiction specialist Dr. Nicolas Kardaras explains, “If we deprive children of interaction and touch early on because they mostly socially interact via screens, those areas [of the brain] won’t fully develop.”⁴³ A growing number of researchers have examined ways to test concerns and statements similar to those made by Dr. Kardaras.

⁴² Kardaras, *Glow Kids*. (p.93)

⁴³ Kardaras. (p.93)

In 2014, a group of researchers conducted a field experiment in California to study the effects of zero screen time on a population of 51 pre-teen students. The students spent five days at a nature camp where neither electronic devices nor access to any screen-based media was permitted. Students spent their days engrossed in face to face, in-person experiences such as hiking, building structures, and living together in cabins. During the same week, a controlled group of 54 students from the same grade level and institution, attended a week of classes with a typical week of instruction and no limits to their tech use. What the researchers discovered was staggering,

We found that children who were away from screens for five days with many opportunities for in-person interaction improved significantly in reading facial emotion (DANVA 2), compared to those in the control group, who experienced their normal media exposure during an equivalent five-day period... Thus, the group that attended camp without access to any screen-based media improved significantly more than the control group, who experienced their usual amount of screen time.

We found a similar effect when using the videotaped scenarios (CASP). Ability to correctly identify the emotion of actors was significantly greater for the children who had experienced five days of camp without personal media than for the control group... Thus, children in the experimental group showed significant improvement in their ability to recognize the nonverbal emotional cues in videotaped scenes, while the emotion-reading cues of the control group showed no change between pretest and posttest.⁴⁴

Research, such as the field experiment conducted in California, crystalizes the importance of in-person and face-to-face interaction in adolescent brain development. These skills are essential for developing *empathy*, which is necessary for full social & emotional development.

⁴⁴ Uhls et al., “Five Days at Outdoor Education Camp without Screens Improves Preteen Skills with Nonverbal Emotion Cues.”

Adolescent cell phone use is a daily struggle for me as a teacher and educator. I observe students engaged with their electronic devices almost constantly and all over campus. Over the years of teaching 9th grade health, I've witnessed a shift in seeing personal electronic devices showing up in class. Back in 2010, roughly three years after the iPhone first came out, only a few students came to class with a cell phone and their phones were rarely out in public. Almost thirteen years later, my classroom environment and teaching style have been significantly altered by the overwhelming presence of cell phones.

During the academic year, I teach three sections of 9th grade health. Each class begins the same way, with students sitting down in their seats, taking out their phones, unlocking their homescreens, and tapping their favorite app—usually Snapchat, TikTok, or Instagram. When I enter the room, I see 10-12 students sitting around a Harkness table, heads bowed and faces illuminated. It is rare for a student to pick up their eyes to acknowledge my presence, unless I've made the first note of greeting, which usually sounds something like, "Hello! Okay, let's get started. Please put your phones on the table up front." My command will break the spell of the glowing screens almost; there is always a student or two who either hasn't heard me or is unable to tear themselves away from their device to put it away. Without fail, as students reluctantly get up to put their phones on the table (silenced and face down) a chorus of groans and grumbles can be heard in anticipation of separating themselves from their devices.

In the spring of 2022, I had a smaller than normal health class of seven students. Though classes of this size can be challenging, I was lucky enough to have a group of students who were outgoing, thoughtful, energetic, and ready to engage each and every class. The class also had students from a variety of backgrounds; two students were international (Turks & Caicos and Thailand), three students identified as BIPoC (Black, Indigenous, and People of Color), one AAPI

student (Asian American and Pacific Islander), two students identified as LGBTQ+, one student was transgendered, five students lived at the school as boarding students, and two students were day students from nearby towns. Class discussions were lively and offered a variety of beliefs and perspectives. Students were respectful and understanding, and the class was able to build a deep level of trust with one another, which allowed class conversations around sensitive topics to be rich, meaningful, and applicable to their everyday experiences. This group was a joy to teach.

Belle was from Turks & Caicos and her golden chestnut hair, amber eyes, and radiant brown skin carried the sunshine with her no matter the weather; it was easy to be warmed by her mere presence. Belle had grown up jet setting around the world with her family, exploring medieval towns along the Mediterranean, skiing the Rocky mountains in Colorado, or walking the soft white sand beaches of South Africa. Though Belle's life experiences were different from most of the students in the class, she was friends with everyone and her affable personality was the glue that held the group together. One of Belle's skills was to use humor to better understand the world around her. Never one to take herself too seriously, Belle spoke freely about her perspectives on the various topics we covered in health, such as body image, relationships, and drugs and alcohol, and she was always game to share her experiences with the class.

Roughly half way through the semester, I had grown lax in checking to see who was placing their cell phones on the front table at the beginning of class. One day in particular, I noticed Belle's cell phone sitting screen side up on her desk and I decided to take this moment to watch how she used her device during class. Though we were in the middle of a lively discussion, in which Belle was an active participant—she continued to “tap” the black screen of her phone every few seconds to check for new notifications. After a few minutes of observing this behavior, I asked Belle to hand me her phone so I could put it on the front table with the rest. Her eyes grew wide with the realization that I was about to take her phone from her, and she pleaded with me to let her keep it

because she “wasn’t using it.” In return, I gave her a knowing glance and simply held out my palm, which she begrudgingly placed the device in.

That was when Belle’s behavior got interesting. When her phone was sitting in front of her, Belle continued to tap her screen to check for updates from her social media platforms, in this case specifically from Messages and Snapchat. It’s likely her behavior may have been subconscious and impulsive. However, after Belle’s phone was no longer in front of her, she continued to “tap” the place on the table where her phone had been moments earlier. When I first noticed Belle doing this, I was caught off guard. Did I really just watch Belle tap the table multiple times as if her phone was still there? Did she know she was doing that? I couldn’t help but feel that the behavior I was witnessing was alarming.

As a teacher, I talk openly and honestly with students about their tech habits and the effects technology may have on their overall development and wellbeing. Students have had countless conversations with their families, teachers, or other trusted adults about the concerns personalized electronic devices and social networking sites may have on their development and wellbeing. It never surprises me to catch a student mid-eyeroll or to lose a student’s attention when announcing *social media and technology* as the topic of the day. In my experience, students tune out these important lessons because their dependence on their phones outweighs any warning or negative consequence they might hear.

To better understand why this might be, it’s helpful to go back to understanding another important aspect of adolescent brain development. As stated earlier, adolescence is a critical time for the brain to reorganize and become more efficient. It is also a period in which teenagers are still developing their executive functioning skills (linking consequences to behavior). For many teens, even though they are aware of the negative consequences their tech use may have on their

development and wellbeing, they instead prioritize the potential positive aspects they may have when using their technology. As one teen stated in an *Atlantic* article about *Dopamine & Teen Logic*, “As teens we are often fully aware of risks of something bad happening; we simply put more weight on the exciting potential benefits of our actions.”⁴⁵ During adolescents the brain has a higher drive toward seeking out experiences that are rewarding.

It is during these rewarding experiences that neurotransmitters deep within the brain produce a chemical called *dopamine*. The behaviors that produce dopamine can shape our habits and how we choose to live our lives. A 2023 news article that examined the ways parents can help their children break their tech and junk food habits argues;

Dopamine is a part of an ancient neural pathway that's critical for keeping us alive. "These mechanisms evolved in our brain to draw us to things that are essential to our survival. So water, safety, social interactions, sex, food," says neuroscientist Anne-Noël Samaha at the University of Montreal.

For decades, scientists thought dopamine drew us to these vital needs by providing us with something that's not as critical: pleasure.

"There's this idea, especially in the popular media, that dopamine increases pleasure. That, when dopamine levels increase, you feel the sensation of 'liking' whatever you're doing and savoring this pleasure," Samaha says. Pop psychology has dubbed dopamine the "molecule of happiness."

But over the past decade, research indicates dopamine does not make you feel happy. "In fact, there's a lot of data to refute the idea that dopamine is mediating pleasure," says Samaha.

⁴⁵ Siegel, “Dopamine and Teenage Logic.”

Instead, studies now show that dopamine primarily generates another feeling: desire. "Dopamine makes you want things," Samaha says. A surge of dopamine in your brain makes you seek out something, she explains. Or continue doing what you're doing. It's all about motivation.

And it goes even further: Dopamine tells your brain to pay particular attention to whatever triggers the surge.

It's alerting you to something important, Samaha says. "So you should stay here, close to this thing, because there's something here for you to learn. That's what dopamine does."

And here's the surprising part: You might not even like the activity that triggers the dopamine surge. It might not be pleasurable. "That's relatively irrelevant to dopamine," Samaha says.

In fact, studies show that over time, people can end up not liking the activities that trigger big surges in dopamine. "If you talk to people who spend a lot of time shopping online or, going through social media, they don't necessarily feel good after doing it," Samaha says. "In fact, there's a lot of evidence that it's quite the opposite, that you end up feeling worse after than before."⁴⁶

The brain's response to activities that emit dopamine—specifically substances or behaviors that elicit higher levels of dopamine such as high sugar or high fat foods, screen time and social media, alcohol, nicotine and other drugs, gambling, and sex—can shape the child's behavior. When dopamine levels are high, the brain understands the situation through the lens that *something is happening right now that is critical to my survival*. So, when the item or substance is "taken away," such as when I take a student's cell phone, agitation arises and the person may feel irritable, upset, or angry. This helps explain why students always grumble and groan when I ask them to put their cell phones on the front table in my classroom. The article goes on to state that, "Research indicates that over time, some people's brains can actually become more sensitive to the dopamine triggered by a particular activity. And therefore, the more time a person spends

⁴⁶ Doucleff, "Anti-Dopamine Parenting? Can Curb a Kid's Craving for Screens or Sweets?"

engaged with this activity, the more they may crave it — even if the activity becomes unpleasurable.”⁴⁷ The drive for the brain to hang onto the dopamine high, and its desire to pursue the activity (or similar activities) again and again, outweighs the consequences—it doesn’t matter how a person might feel after they’ve eaten six pieces of pizza; stayed up until the early hours of the morning binge watching a television series; or scrolled mindlessly on TikTok for hours on end.

The teenage brain is especially susceptible to these types of behavior seeking and reward responses in part because it is not able to make good decisions in these moments. The underdeveloped prefrontal cortex (executive decision making), coupled with the brain’s desire to do the activity that is critical to its survival (due to the dopamine high that comes when doing the activity) makes it extraordinarily difficult for teens to have self control. Adolescents spending nearly eight hours per day using screen-based technology, is a significant amount of time to spend on one type of activity each day. This could mean that adolescent brain development may be affected by high amounts of screen use, “...the more time a person spends engaged with this activity, the more they may crave it.”⁴⁸ For Belle, her regular use of social media became a behavior she engaged with even when she wasn’t noticing it. Her frequent tapping of the homescreen was impulsive, passive, and subconscious. This became evident when Belle’s brain and her body continued to tap the table where her phone had been even after it had been removed.

Studies have also shown that social media sites have been purposefully developed to tap into our brain’s dopamine response to keep users coming back to their sites again and again. Every time there is something new or exciting on a user’s social media site, dopamine receptors tell the brain that this activity is worth coming back to. Then, when you add on “like” features and

⁴⁷ Doucleff.

⁴⁸ Doucleff.

notifications, which can give the user an additional “hit,” the dopamine response is even higher.⁴⁹ This feedback loop is the key feature of social media apps—they have been designed to be driven and reinforced by dopamine. As Dr. Nicolas Kardaras writes, “[social media is]...a medium that has our dopamine receptors on perpetual high alert as we anticipate, like Pavlovian dogs, the next “ping” that promises to offer us the novelty and pleasure of a text, IM, tweet, Facebook update or Instagram photo.”⁵⁰ The immature adolescent brain makes an easy target for the design of many social media apps.

At one point after Belle tapped the empty space on the table, a realization crossed her face and she looked up at me. Our eyes met briefly and in that moment her expression let me know we both understood what had just happened. I gave Belle a look of concern as she said, *Oh my God*, which caused the other students in the class to jump to attention to see what it was they had just missed. With Belle’s permission, I explained to the class that for a while now, I had been observing Belle mindlessly tapping the space in front of her where her phone had been. Belle, though mortified, was in disbelief; she could not believe her body continued to “check her phone” not only because it was not there, but also because she was not aware she had been doing so. This was a powerful moment for Belle, our class, and for me as an educator. Though we had already covered our technology unit, it wasn’t until this moment that it seemed to really sink in for my students that they could be—even were—being affected by technology and possibly even on a subconscious level. In true Belle form, her immediate concern turned to motivation for her to spend less time on social media and leave her phone in her room during the academic day. It also sparked a passionate conversation about how (and when) adolescents learn about the impact of technology on their development and how (they felt) students were getting this information much too late in their lives—most of them had been using electronic devices for years at that point.

⁴⁹ “Trapped - the Secret Ways Social Media Is Built to Be Addictive (and What You Can Do to Fight Back).”

⁵⁰ Kardaras (p.91)

The age at which adolescents first engage with screenbase technology may have a significant impact on their physical development and wellbeing. Their brain development during this critical restructuring phase makes them more susceptible to seeking out and sustaining behaviors that elicit positive dopamine responses. Whether on their phones, tablets, laptops, or watching television, teens spend over eight hours a day in front of screens. Studies have shown that neurotransmitters in the brain release dopamine when adolescents engage with screens and social networking sites. It is this persistent cycle of dopamine that keeps adolescents using, and coming back to, their screens time and time again. Further, when dopamine levels drop, teens feel badly and their bodies respond by finding ways to engage in activities that will increase dopamine levels.

Conclusion

Throughout the past ten to fifteen years, a notable theme has emerged in my experiences and observations of my students: their physical ailments have increased at the same time as their increased use of screen-based technology. Though this chapter covered a few of the possible effects of technology on the physically development and wellbeing of adolescents including musculoskeletal disorders in the neck, back, head, and spine; eye development and eyestrain; sleep disruption and cognitive impairment; and brain development, cognitive restructuring, and feedback loops for dopamine, there are even more ailments plaguing teens not addressed in this paper. Though I haven't had first hand experiences with students struggling with these specific ailments, I am highly aware of students at my institutions who have struggled with reduced physical activity, overeating, and obesity due to their tech use behaviors. Being a member of the student support team at a number of institutions has given me insights into the addictions students have developed for online gambling, pornography, videogames and shopping. All of these

ailments and behaviors have an impact on the child's cognitive and physical development during a critical stage in human development. If the behaviors are not addressed by a team of caregivers, including the student's family, their pediatrician, and the school, the student may have to deal with these issues well into adulthood. The throughline here is that the introduction of screen-based technology (especially the use of personalized electronic devices such as cell phones) has significantly altered the physical behaviors and development of adolescents in ways educational practitioners, medical experts, and researchers are still trying to understand.

Through my day to day work with adolescents, I'm able to see their relationship with technology in all facets of teenage life. Unlike public school institutions, boarding schools allow educators to see the student experience both inside and outside the classroom, including their relationships with their peers, their extracurricular activities, and how they spend their free time. These circumstances provide a holistic picture of how a student may be doing mentally, socially, and emotionally. The next chapter takes a deeper look into the possible impact technology may have on the social and emotional wellbeing of adolescents through first hand experiences I have had during my career.

3 | Effects of Technology on the Social & Emotional Wellbeing of Adolescents

Introduction

For many, the time of adolescents can be one of joy and struggle, ups and downs. It's a period in life that comes with great growth and change. From shifting bodies to a growing independence from caregivers, it can be one of the most difficult times in life.

As mentioned earlier, during the teenage years, one of their greatest sources of strength and support for adolescents often comes from their peer group, or “tribe.”⁵¹ Having friends who are on a similar journey gives teens a sense of “togetherness” to know they are not in this difficulty alone. As psychologist and researcher Dr. Lisa Damour explains in her book *Untangled: Guiding Teenage Girls Through the Seven Transitions to Adulthood*, “I cannot overstate the significance of a teenager’s tribe membership. Teenagers aren’t just looking to make friends, they are replacing the family they’ve withdrawn from (or, at least, might barely acknowledge in public) with a tribe that they can feel proud to call their own. Failing at this, they are left with the stomach-turning options of returning to the bosom of their family or navigating the world alone.”⁵² Many teens find their peer group through commonly held interests, activities, or academic pursuits.

Securing a “spot” in a peer group for most adolescents is a top priority when entering a new school, such as high school, and can often be a source of stress and anxiety. As someone who has directed new student orientation in the past, one of the most important focuses during the first few weeks of school needs to be on relationships and team building. Helping students to secure at least one peer or friend to begin their time at a new institution often leads to greater confidence,

⁵¹ Damour, *Untangled*. (p. 48)

⁵² Damour. (p. 48)

success, and happiness. While these friend groups might (and should) change during the students' time at school, beginning their experience feeling connected is of the utmost importance.

Over the past ten to fifteen years, the ways in which students initiate and build their tribes has shifted in significant ways. Though in-person experiences are valuable and do happen at activities during orientation, the reality is that students are often “connected” to one another well before they even step foot on the campus of their new schools. Long gone are the days when students would show up for registration, not knowing another soul. Today, most students connect with one another via social media platforms such as Snapchat, Instagram, and TikTok months before the opening of school to get a sense of what students are like at their new school and who they might “fit in with” to join or form their new tribe. Social media has been a wonderful way to connect adolescents with peers who share similar interests or who are joining a new community. Chatting on social media platforms can be a way for adolescents to ask questions, share their worries, drum up excitement, or to even begin to find their place within a new community.

Though forming adolescent relationships through social networking sites is meaningful and has value, my work with adolescents has also shown me that the social experiences teens have using social media can be vastly different from experiences they might have together if they were in person. Throughout the stages of social media, from the early days of Facebook to the most recent trends on TikTok, I've seen first hand the ways in which adolescents have been negatively impacted by both their own misuse of social media or by being the target of someone else's actions online. The rate at which students are being affected by incidents that happen online is concerning and is having a significant impact on their social and emotional wellbeing.

Part I: Social Skills Development & Technology

A few years ago, I was serving as the administrator on duty, which meant holding the emergency phone and supporting the residential team that was on duty that weekend. It was a Saturday night and my next stop was to chat with Mr. McKenzie, a junior/senior girls dorm resident, who was hosting a student activity and showing a movie in his apartment. There were seven students in attendance, all scattered throughout the living room on worn oversized sofas or misshapen beanbags pulled in from the common room. The students ranged from sophomores to seniors, hailing from around the world including Sudan, the Marshall Islands, India, and the United States. After walking through the open apartment door and climbing the three steps to the living room, I immediately heard Siri explaining the plot and characters of her favorite Bollywood movie playing on Mr. McKenzie's flat screen television.

As I quickly scanned the room before locating Mr. McKenzie, I couldn't help but reflect on my observations; how wonderful it was that a group of students whose cultural identities consisted of Indian, African, Marshallese, Latinx, and Caucasian were hanging out together on a Saturday night, watching a Bollywood film. I felt a deep sense of hope for a peaceful and better world. This was the stuff independent boarding schools aspired to each day.

Caught up in my own vision of boarding school perfection, which admittedly was a false sense of reality, it took me longer than it should have to notice that Mr. McKenzie was the only person in the room paying attention not only to Siri, but also to the movie. My blissful image of a cultural utopia was fading away as I took in what the students were actually doing (or not doing). The students sat fixed in place, heads down, eyes narrowed, expressions flat, with fingers swiping repeatedly over their screens. Of the seven students in the room, six were engrossed in their personal devices, either smartphones or tablets, and one even had earbuds in. It was hard to bear,

seeing a room of kids all glued to one device or another, not talking, looking, or interacting.

Come to think of it, when I entered the space Siri and Mr. McKenzie were the only ones in the room to look up and respond to my greeting.

In my various roles working in independent schools, I observe adolescents using technology all the time, and though I was becoming increasingly concerned about its prominence in their lives, that moment in Mr. McKenzie's apartment crystalized my concern was no longer growing; it had evolved completely and in full force.

All of the girls in Mr. McKenzie's apartment are part of Generation Z, those born between the mid-nineties to today, and they are dually labeled the "always on" generation, or AO. As children, they've grown up in a hyperconnected digital world surrounded by smartphones, tablets, laptops, and a myriad of screens with round the clock access to the Internet. I wish I could say the night of the movie in Mr. McKenzie's apartment was an unusual scene; however, as most of my fellow colleagues in independent schools, especially those in boarding institutions, can attest to, seeing groups of students sitting around engaged solely with their personal devices, and not with each other, is today's standard. As an educator, I've questioned the extent the countless hours my students spend using their electronic devices has had on their development and the consequences this may have on their own social and emotional wellbeing.

I couldn't help but feel disturbed by these non-social social interactions. I pushed myself to reflect inward to ask whether I had a personal bias against social media and/or if my views were just "old fashioned" and outdated. However, from infancy and throughout our lives, our connections with our caregivers, other trusted adults, and our peers is how we develop our communication, cognitive, emotional, and social skills. This requires in-person experiences to

read and practice verbal and non-verbal body language, develop empathy and compassion, and to build resilience.⁵³

The practice of being in new situations is critical during childhood and adolescence. The successes and failures that come from navigating these scenarios helps to build confidence, self esteem, resilience, and gives individuals a new set of skills to draw on for the next time. Studies show, however, that adolescents are using technology to avoid these uncomfortable moments, opting rather to stay within the comfort of their screens rather than to navigate the awkward eye contact and exchanges of hellos. In 2019 Katherine Schaeffer, a research analyst at Pew Research Center, found that “...while phones are a way for teens to connect with other people, they can also be a way to avoid face-to-face interactions. Roughly four-in-ten teen cellphone users (43%) say they often or sometimes use their phone to avoid interacting with people. This is truer for teen girls than teen boys. Roughly half of teen girls who have access to a cell phone (54%) say they often or sometimes use their mobile device to avoid social interaction, while 31% of teen boys report doing the same.”⁵⁴ Putting oneself out there can be challenging, especially for adolescents, and social and emotional learning must be practiced during this time of development.

According to the *Collaborative for Academic, Social, and Emotional Learning (CASEL)*, “...social and emotional learning (SEL) as an integral part of education and human development. SEL is the process through which all young people and adults acquire and apply the knowledge, skills, and attitudes to develop healthy identities, manage emotions and achieve personal and collective goals, feel and show empathy for others, establish and maintain supportive relationships, and make responsible and caring decisions.”⁵⁵ CASEL promotes social and

⁵³ “How Does Technology Affect Children’s Social Development?”

⁵⁴ NW, Suite 800 Washington, and Inquiries, “Most U.S. Teens Who Use Cellphones Do It to Pass Time, Connect with Others, Learn New Things.”

⁵⁵ “Fundamentals of SEL.”

emotional learning in five specific areas of development, also known as the *CASEL Wheel*. These areas include *Self-Awareness*, *Self-Management*, *Responsible Decision Making*, *Relationship Skills*, and *Social Awareness*.⁵⁶ Research shows that social and emotional learning can make a positive difference in the lives of individuals and communities including, improving academic performance, promoting and maintaining healthy relationships, improving mental health and wellbeing, and for being a powerful lever by creating caring, just, and inclusive communities that value equity.⁵⁷

Armed with this information, I decided to poll my 9th grade health class this past spring to see if they agreed with Schaeffer's analysis about teens using their screens as a way to avoid interacting with others. Overwhelmingly, the students all claimed to do this exact behavior for these very reasons stating, "It's so *awkward* Kristen! I never know where to look. I always check my phone when walking from building to building;" or "I don't want to say hi to people I don't know. What if they don't say hi back?" and "It's really weird if you aren't looking at your phone when everyone else is. I don't want to be the only one who isn't looking at my phone." What I hear underneath my student's honest and vulnerable responses is that they have not yet built the social and emotional skills to sit in these moments of discomfort. Even if they take a risk and say hello to a new person, or if they might be one of only a handful of students not looking at their phones, these brief interactions will likely not have a negative impact on their overall wellbeing. In fact, the opposite may be true in that the more face-to-face interactions students have and the less time they spend on their screens, they will likely feel more connected, less anxious, and improve their social and emotional wellbeing.

⁵⁶ "Fundamentals of SEL."

⁵⁷ "Fundamentals of SEL."

There are two specific areas to discuss further regarding my exchange with my students around this topic. First, my students confirmed for me my day to day observations of their behavior when walking between buildings was accurate. Though I saw this happening on a regular basis, I often wondered if the students were aware of it. Did they notice that most people were looking at their phones rather than looking at one another? It was a relief to hear them express that they are physically and emotionally uncomfortable being in situations (such as walking to class) where they may have to look someone they do not know in the eyes and to express a greeting of hello. For them, it was a simple and easy decision to keep their eyes down and on their screens rather than to engage in a face-to-face interaction.

What Schaeffer's study could not take into account in 2017, because the technology had yet to emerge, was the impact of earbuds or AirPods (wireless bluetooth earbuds) on social interactions. In addition to avoiding awkward glances with others by looking at screens, teens also use their earbuds to tune out the sounds around them. So they can tune out not only the visual, but the audio as well. This can be especially problematic for adults who work with students with long hair, hoods, or hats that cover and hide the ears. I see this often in classes or during all school events. The wireless technology makes it so that students appear to be engaged and paying attention when in fact, they are listening to their favorite music artist, podcast, or they may simply have them in as a signal to tell others they are unavailable. To take my students' feelings a step further, what if they try bravely walking up the path on their way to lunch, not looking at their phone, with the intention of making eye contact with another student to say hello, only to have their shaky greeting ignored because the other student had noise canceling AirPods in? For many teens, it would be difficult to try this experiment again for fear being rejected. The student would likely resort back to the old ways of staring at their screens while walking up to the dining hall, or even worse, popping their own AirPods in.

The second point to dive deeper into is the barrier that screen-based technology can create when helping to build healthy communities. This point is especially relevant following the COVID-19 pandemic. Earlier on in this paper, I wrote about my experiences working in a boarding school before smartphones were developed. As part of my work, I helped to interview prospective families in the admission office. More often than not, families observed and commented on how often students made eye contact, said hello as they passed by on walkways, or held the door open for other people behind them. These types of behaviors are small examples of ways to build community; acknowledging others and thinking of the wellbeing of the community. Today, however, I no longer hear these types of comments and see these behaviors when spending time on my school's campus or when visiting other institutions. Though these social interactions might not seem pertinent or relevant to the impact of technology on the social and emotional development of adolescents, I argue they are examples of some of the critical components of healthy communities, which are essential for development and wellbeing.

More than ever, teens are craving connection. At my current institution, students reminisce about the way the school's community used to be prior to the pandemic. Though there is likely much truth to these beliefs, it is also probable that the community was suffering (to some degree) from a lack of in-person connection prior to the COVID-19 outbreak due to the impact of screen-based technology. The ailments outlined throughout this paper had been present in independent high schools for many years prior to the pandemic. What is important here, however, is that students are able to recognize within themselves and vocalize what they need. In essence, they wish for a community that fosters individual connections, prioritizes emotional and mental wellbeing, centers around community based activities that actively promote inclusivity and sense of belonging, and provides ample opportunities for play and fun. These descriptions make me yearn for school environments that can be smartphone-free, such as the types of education environments I experienced during the first ten years of my career. They also underscore for me that no matter

how sophisticated an app or digital program might be, it cannot create this type of experience in the same way an in-person experience can.

For adolescents, building social and emotional skills to fully engage in community requires practicing SEL skills over and over again. But, as described previously, there are ways technology allows teen users to avoid leaning into developing these skills. Unfortunately, if students do not continually grow their SEL skills, such as by engaging in new and sometimes awkward in-person exchanges, it may lead to further isolation, loneliness, and underdeveloped social and emotional skills.

As I stood from my desk after talking to Erik's mother Liselle for the past 45 minutes, I stretched my arms and processed our conversation. Liselle had reached out to me in early spring because of her concerns about her son's lack of connections with his peers. As a new 9th grade boarder from New York, Erik struggled throughout the year to develop meaningful relationships beyond one friendship he had with another student in his dorm. Though his dorm parents had tried to engage him multiple times to participate in at least one social activity each weekend, Erik usually gave a halfhearted attempt or refused, instead opting to spend his weekends alone using his cell phone or playing video games in his room. At this point his mother felt unsure how to help him develop meaningful connections with his peers. After hearing how Erik spent his time on the weekends, I couldn't help but wonder if he didn't have access to technology in his room, how might he use the hours he is currently using scrolling endless social media feeds or playing Xbox?

Though the dorm faculty rightfully confirmed that Erik needed extra encouragement and support to build social connections with others, they felt there was little they could do to actually get him to socialize with others. For Erik's full and healthy development, he needed to be able to navigate new and socially awkward situations to not only build his own confidence and self esteem, but

also so he could make connections beyond the limited friendships he had in his dorm. However, how does one do this when personal electronic devices become students' "rights" and personal property that we, as their caregivers, do not feel we have the authority to confiscate (cell phones), even if it is in their best interest? Friendships through social media are not necessarily bad or hurtful, and they might even help support Erik's journey to building more social connections. The problem is, however, that technology is used to replace in-person social interactions, especially when adolescents spend more time interacting with peers online than they do in-person. It is especially concerning when students develop a pattern of behavior where they begin refusing to engage in social activities altogether.

Social networking sites can be a perfect platform to satisfy a teenager's innate desire to be connected with others. The very structure of social media apps allows for a mixed media of social feedback with features such as the "like" or "heart" button, comments, and a counter for how many followers a user has. For many teens, the assumption is that the more followers, likes, and comments a person has, the more they are "liked" and the more meaningful connections they have. However, researchers are finding the opposite effect is actually true. A 2019 study published in the *Journal of Social and Personal Relationships* titled *Less in-person social interaction with peers among U.S. adolescents in the 21st century and links to loneliness*, found that "Adolescents low in in-person social interaction and high in social media use reported the most loneliness."⁵⁸ Studies such as these provided insight for me to better understand some of the struggles my students and their families have recently been navigating and looking for support from their schools.

⁵⁸ Twenge, Spitzberg, and Campbell, "Less In-Person Social Interaction with Peers among U.S. Adolescents in the 21st Century and Links to Loneliness."

Luca was a new 10th grade day student who had missed the opening days of school. He and his parents were anxious about him missing registration and the 10th grade class bonding activities, so I offered to greet him on his first day to take him around campus to show him where his classes were. Luca was a tall young man with dark, well styled hair, amber colored eyes, and rich olive-toned skin. He was dressed in designer clothes and I felt a bit shabby as we strolled around campus together, though Luca's warm and calm demeanor made it easy to feel comfortable in his presence. As I showed Luca the school's main academic buildings, I learned he had recently moved to the area so his family could be closer to his mother's medical office where she practiced as a general surgeon. While Luca was getting used to their new home, he was excited about high school.

As one of the 10th grade class deans, I saw Luca often and would check in with him from time to time to see how his transition was going. A few weeks into school, he shared with me that he was having a hard time making friends and was struggling to feel happy at school. Understanding the challenges of meeting new people and making friends, I reached out to some of the day student leaders in his class and asked them to invite Luca to lunch or to an activity being offered that weekend.

After another few weeks went by, I received a call from Luca's mother, Aadya, who shared with me that from her observations, Luca did not seem to have any meaningful relationships on campus. From what she was hearing and seeing from Luca's behavior it seemed he had decent connections with his peers in the classroom, but when classes were over he spent all of his free time alone in the day student lounge. I shared with her my attempts to connect Luca with some members of his class by engaging some of the more outgoing students and we agreed to give Luca's transition more time with more check-ins both with Luca and with one another. We were going to talk again in two weeks.

Armed with this knowledge, I decided to take a walk through the day student lounge one day after classes. Since it was a rainy day, many students found themselves without an afternoon sports commitment and the lounge was busy; students were clustered together talking or listening to music, working on homework, or playing video games on their phones. It took me a minute to find Luca, who was sitting by himself in a chair at the edge of the room. With his hood over his head and his eyes glued to the screen of his phone, which he held in his lap, Luca did not notice when I approached him. After saying hello, he picked his head up and gave me a quick greeting, much shorter and not as warm as our previous exchanges. Sensing he wanted space, I continued to move through the lounge saying hello to and checking in with other 10th grade day students.

The next day, I decided to give Aadya a call and not wait two weeks until our scheduled check-in. I shared with her my observations of Luca's behavior in the lounge and how I wondered if his use of his cell phone might be getting in the way of his ability to make connections with his classmates. Aadya shared with me that it was also a growing concern for her because as parents, she and her husband monitored Luca's phone usage from time to time, and they noticed that over the weekend, Luca spent 10 hours a day using TikTok. We both agreed that Luca's online patterns and behaviors might be limiting his chances to make in-person connections with his peers.

Though Aadya knew Luca spent time on his phone using his social media apps, she assumed it was helping him make connections with students at school. Aadya initially had supported Luca's online behavior for making social connections, but she now feared the pendulum had swung too far and he may now be using his phone to avoid in-person interactions, rather than make them.

Maintaining online connections with their peers is a powerful force for teens and for some, can come at a cost to the individual's social and emotional wellbeing. Luca's decision to remain

isolated and use technology rather than engage in-person with classmates only furthered his social isolation.

In both student examples, Luca and Erik were highly connected to others virtually, though they had low in-person social interactions with peers, which is likely one of the reasons they felt lonely and isolated. It appeared that high virtual engagement could not on its own substitute for in-person connections. Further, as more and more time passed, it became increasingly difficult for both students to form these desired in-person connections, which only pushed them to use technology. If they could still see what their classmates were doing and saying, they were still in the “know.”

I saw this phenomenon of technology as an essential conduit in a slightly different form one afternoon while sitting in my office with Grace, a 9th grade day student who was entering the spring term at a new school. Grace had recently violated a few major school rules for making a hurtful and disrespectful Instagram video about other students at the school. Concerned for Grace’s wellbeing, I shared with her my observations of her from the year. She formed a close relationship with a group of returning students who had a reputation for being “mean girls.” Grace’s friendship with the group concerned me because Grace had been known for her kindness prior to coming to her new school. Throughout the year, I saw Grace change to become more similar to her friends in both appearance and in her actions. In our moment together, I felt sure that if I could get through to Grace one-on-one and tap into the old Grace that valued kindness and compassion, she could recognize and grow from her mistakes.

While sitting in my office, Grace kept her cell phone resting on the coffee table between us. It seemed that every few seconds her phone would buzz as she received a new text message or Snapchat notification, pulling her attention away from our conversation (and toward the glowing

light of her screen). I was shocked by Grace's lack of awareness; she was, after all, sitting in the dean of student's office, awaiting the disciplinary outcome from her recent school rule violations.

I decided to call Grace's attention to the behavior I was witnessing. I shared with her my concerns and how I thought it might be good for her to take a break from social media and her phone for a while. Convinced she would be able to have some self-awareness and understand my concerns, I was stunned by her explosive response. Shattering my assumptions, Grace immediately snatched her phone off the table and ran out of my office, screaming *never!*, while I sat there wondering what in the world just happened.

While working with Grace's family during her recent disciplinary infractions, I learned that she had only just gotten a cell phone the summer before coming to her new school. Grace's parents felt she was socially immature and they were not confident she was ready to navigate the world of Instagram, Snapchat, and the like. Grace's constant pleading, the long commute to and from the school, and the convenience of being able to reach her at a moment's notice ultimately pushed her parents to buy her her first smartphone. Grace's response to my suggestion of taking a break from her phone, illustrated how vital her connection to her device was.

This conundrum is often a common situation teens, their caregivers, and schools face when students misuse their devices. When teens make poor choices with their tech use, the instinct is to take it away, but my experiences are finding that more and more, adolescents are allowed to maintain possession of their personal devices, perhaps with more limits. The reasoning behind these decisions is often driven by the duress teens feel and express when they do not have access to their phones. The same article published by research analyst Katherine Schaeffer found that "More than half of teens (56%) associate the absence of their phone with at least one of three emotions: loneliness, being upset or feeling anxious. Girls are more likely than boys to feel

anxious or lonely without their phone.”⁵⁹ Additionally, they can feel that their phone is their primary connection to their friends and social groups, and without this connection, teens can feel socially isolated or outcast. These feelings and experiences have even been given a name by medical experts-- “fear of missing out” or FOMO, refers to an anxious feeling or insecurity people get when they feel they are missing out on an event or opportunity.⁶⁰ In an article published in the *Journal of Motivation and Emotion*, researchers who studied the effects of FOMO on college age students found “[m]ore frequent experiences of FOMO were associated with negative outcomes both daily and over the course of the semester, including increasing negative affect, fatigue, stress, physical symptoms, and decreased sleep.”⁶¹ Adolescents are literally afraid of missing out on knowing what is going on socially because (they feel) not knowing has the potential to socially isolate them.

This knowledge helped me to better understand and relate to the actions of a senior boarding student one spring. While at the dining hall, supervising the lunch shift one Friday afternoon, I observed students chatting exuberantly while sitting together happily eating their fajita lunches. A popular spot on campus for socializing, the dining hall often needed an extra set of hands to help maintain the rules and expectations of the students including not using their personal electronic devices and cleaning up after they finished their meal.

While weaving my way through the myriad of tables, chairs, and backpacks I noticed Olivia at the far end of the room using her phone to show a funny YouTube video to her friends. As a four year senior, Olivia was well aware of the rules in the dining hall, so I was surprised by her boldness and disregard for community expectations, though in all fairness this was not

⁵⁹ NW, Suite 800 Washington, and Inquiries, “Most U.S. Teens Who Use Cellphones Do It to Pass Time, Connect with Others, Learn New Things.”

⁶⁰ “Definition of FOMO | Dictionary.Com.”

⁶¹ Milyavskaya et al., “Fear of Missing Out.”

uncommon as seniors got closer to graduation, ready to depart high school for the less restrictive environment college provided.

Choosing not to make a scene, I casually walked up to Olivia and held out my hand. Though she looked at me with shock and horror, she knew what I was asking for and she reluctantly handed me her phone. I told her she could pick it up at the dean of students office once I was done with my dining hall shift. I walked over to my school bag, which was placed to the side of the room, and put Olivia's phone inside my bag, after which I continued on with my dining hall duty for another thirty minutes.

As I prepared to leave at the end of my shift, I opened my bag to take out my jacket and noticed Olivia's phone was not in the spot I left it. At first, I thought I might have placed it in another pocket, but after giving my bag a thorough check, it became clear the phone was no longer there. At that point, I looked over to the table where Olivia had been sitting just a half hour earlier. My gaze met the eyes of a few of her friends who had observed our interaction. Though I could see the worried looks on their faces, I did not see Olivia at the table; it was clear she was gone and so was her phone. I decided to approach her friends to ask them if they saw Olivia take her phone out of my bag. The students quickly looked away, unwilling to involve themselves in the matter. Though the students "appeared" to not want to be involved, I had a hunch that I would be able to use them to get a message to Olivia. Looking in their direction, I commented that going into a teacher's bag without their permission was a big deal and I would need to share this information with the dean of students office.

My next steps took me right to the dean of students office to explain what happened in the dining hall. I was furious that a student had the nerve to go into my bag knowing after they had already violated a school policy. Olivia arrived shortly thereafter to explain herself and to offer an

apology. After having some time and space from this experience, I was able to gain a new perspective. My personal property had been violated when Olivia rummaged through my bag, and it was clear she felt similarly when I took her phone away. I had enough of an understanding of adolescent brain development to know their frontal lobe was underdeveloped, which could, at times, lead to impulsive and reactionary behavior from teens. I was also well aware of the physical and emotional attachment adolescents had to their phones, and how these two developmental milestones could lead to poor decision making and even risk-taking behavior. While I did not excuse Olivia's actions, I could certainly understand and empathize with her.

Part II: Social Media & Cyberbullying

Though risk taking behavior during adolescence is developmentally appropriate, the fundamental design of social networking sites such as social media, text messages, and video games, limits the amount of monitoring caregivers and schools can give teens. We simply have limited access to see what they are doing online. As such, adolescent risk taking has changed and behavior online can easily go unnoticed by the adults who are meant to help keep adolescents safe. Knowing the average teen uses screen-based activities eight hours a day and at all hours, it is unrealistic for parents and schools to have a complete sense of what their children and students are doing online. From my experiences, it is often not until a student is in real crisis or is deeply worried about a peer, that they will seek out help from a trusted adult.

It was in my role as a dean of students at a girls' school that I felt I had a more in depth understanding of the multiple personas my students had using social media. Having developed meaningful relationships with them, students would seek me out for advice on how to navigate a difficult situation with a peer or adult, or to share with me concerns about a friend.

In a student-centered role, such as the work of a dean of students, I never knew when I might receive an urgent call about the wellbeing of a student. This was why during winter break one year--a time when students were home with their families or caregivers--I was surprised to receive a late night phone call from one of my advisees. It was around 10:00 p.m. when Libby's number flashed on my screen. Though I would not normally take a call that late at night from a student during a school break, I also knew that Libby would never reach out to me unless the need was urgent. After accepting her call, I could hear the panic in Libby's voice as she went on to tell me about an incident that had just happened between her and her friends from school. Since it was the break, the girls were scattered throughout different cities and states in New England, and were not able to be together for the next few weeks. Though they were not physically together, they were in touch constantly throughout the day using Snapchat, text messages, and video calls.

The girls had been growing increasingly worried about their friend Anna, a boarding student from a wealthy suburb of Boston, who had been regularly posting sad and depressing messages on her Instagram account. Anna was adopted from China at a young age by her parents and she struggled with depression and anxiety since she first arrived at the school five years earlier as a boarding student in the eighth grade. Though our school was only a few hours away from Anna's home, her parents were not able to visit her regularly, because of the demands of their jobs as corporate attorneys. Anna's school had become a home away from home and now as a senior preparing to leave for college, Anna was struggling deeply with not knowing what the future held; what would she do after she graduated from high school? Where would she go to college? What would happen to her friend group after they all graduated?

The feelings and existential questions Anna was grappling with is what most high school seniors experience at one time or another. The anxiety of the unknown affecting adolescents profoundly is not new. However, what is new is that some teens are now using their social media accounts to

share and process their feelings, such as the difficulties some teens experience as they prepare for the transition from high school to college.

For a few days now, Anna's friends noticed she would post low lit and dark pictures of herself with captions such as *depressed* or *never going to college*. To help Anna feel better, her friends would schedule a group video call or send her silly Snapchats. However, they became worried when Anna stopped responding to their text messages and opening their Snapchats altogether. Desperate to make sure she was okay, they continually checked her Instagram account for new posts. Around nine o'clock one evening, their alarm became full blown worry when they viewed Anna's last post, in which she shared a picture of herself crying in the dark with the caption, *no one cares. I don't care. what's the point anymore.*

Though the girls were close with one another, they had not spent much time with the families of their friends. This was one of the main reasons for Libby's call that evening. With Anna not responding to her friend's calls and messages, they became desperate to contact someone who could check on her. Since they did not know Anna's parents' phone numbers, they decided to reach out to me to see if I could help. I quickly understood the seriousness of their concerns and called Anna's parents. After a brief conversation to let them know why my call was urgent, we quickly hung up so they could go and check on Anna, whom they had not seen since dinner.

Anna's parents called me about thirty minutes later to give me an update. The conversation I had with them that evening was a difficult one. The nature of the late night phone call was one that was especially difficult for her mother, Elizabeth, to process. Though Anna was away at school, Elizabeth followed Anna's social media accounts and never had seen anything alarming or concerning about her posts—certainly nothing like the pictures and captions her friends described. This was when I had to explain to Elizabeth that it was likely Anna had more than one Instagram

account. Adolescents in particular often use their social media accounts to show the good, the bad, and the ugly—just not all under the same profile. Many students have both an *Insta* and *Finsta* account, with the Insta account reserved as the account for the posts your parents would approve of. Students often use their Finsta—or *fake-insta*—account to show the “real” them. It is likely an account with fewer followers and with more risky posts that can include content such as unfiltered and unflattering selfies and/or substance use, images that are sexual in nature, unkind, mean, or comments of a bullying nature, and sad, depressive, or suicidal comments.

Finsta accounts can be problematic because these accounts are often used to process challenging experiences adolescents may face during this difficult time in their development. Though students believe only a small group of people can actually see these images, comments, and posts, in reality anyone can take a screenshot of the content and share the image with anyone outside the group. This is often how I became aware of many of the most serious and alarming student behaviors, they came from well-intentioned students whose concerns about their friends’ behaviors and wellbeing surpassed what they thought they were capable of supporting.

Though Elizabeth thought she was doing all the right things in monitoring her daughter’s wellbeing by following her social media activity, the reality is teens find ways to process away from the watchful eye of their families and caregivers. Many adolescents are now using social media as a platform to share and get support for their struggles, particularly from their closest peers, and the content of these posts can be really concerning. The friends are then left trying to figure out just how “real” the nature of a friend’s post is when she says, *what’s the point anymore*. Additionally, students have very few resources to use when they are concerned about the wellbeing of their friends. Since friendships and friend groups are so critical during this stage of development, teens are hesitant to reach out to adults for help because it might mean they are then rejected from their friend group for breaking confidence. Students have the unreasonable task of

trying to gauge subtle clues to decide just how sad Anna is today, and does this post mean she might actually hurt herself or take her own life? Since teens use their social media constantly and at all hours of the day, they then can have experiences similar to those of Anna's friends at any time of the day or night.

Thankfully in Anna's case, her parents were able to sit with her throughout the night and hear how she was really doing. Anna shared with her parents her posts on her Finsta account and what this account meant to her—why she used it and the role it played in helping her share her emotions. Anna had struggled with depression for years and had gotten to a point where she was now having thoughts of suicide. She felt ashamed of her feelings and didn't want to bother her parents with her burden as she knew they both had demanding careers. Anna was soon evaluated by her primary care physician and spent time as an outpatient at a mental health care facility. It was through sharing her story with her parents and medical caregivers that Anna was able to take her first steps toward feeling better.

Anna's story is one of many teenagers who use social media as a way to process, cope, and, for some, to cry for help with their emotional struggles. Without the concern and action of Anna's friends, it might have taken much longer for Anna to get the help she needed, or there could have even been the possibility that Anna could have acted on her suicidal feelings.

The relationship teens have with technology is complicated. On the one hand, it can help build and sustain their social connections with their peers, and on the other, it can have a negative impact on their mental and emotional wellbeing. Medical experts and researchers have found a strong correlation between social media use and an increase in anxiety, depression, loneliness, and suicidal ideation in teens with numbers being higher for girls than boys. An article published in the *Clinical Psychological Science* by Jean M. Twenge, et al. cites, "Adolescents who spent

more time on new media (including social media and electronic devices such as smartphones) were more likely to report mental health issues, and adolescents who spent more time on nonscreen activities (in-person social interaction, sports/exercise, homework, print media, and attending religious services) were less likely. Since 2010, iGen adolescents have spent more time on new media screen activities and less time on nonscreen activities, which may account for the increases in depression and suicide.”⁶² Further, research suggests that teens like Anna, who are considered high-risk users because they already have diagnosed mental health ailments such as depression, are known to use more digital media.⁶³

When compared to their peers, adolescents like Anna who already suffer from mental health and wellness issues use social media platforms and other screen-based media as a way of coping with their negative feelings and expressions. But what impact might this increased use of technology have on high-risk adolescents? A 2017 study, titled “Daily Digital Technology Use Linked to Mental Health Symptoms for High-Risk Adolescents,” examined this very question by surveying roughly 150 adolescents, ages 11-15, and over an 18 month period. Their study found, “some positive effects of technology use. On days when adolescents spent more time using digital technologies they were less likely to report symptoms of depression and anxiety.”⁶⁴ Another study found that adolescents may experience more social benefits through online communication than in person due to anonymity and less worry about privacy and stigma. Specifically they can connect with others who have also experienced mental illness and provide social-emotional support through shared hope and decreased feelings of social isolation (Naslund, Grande, Aschbrenner, & Elwyn, 2014).”⁶⁵ Though both these studies were able to find positive

⁶² Twenge et al., “Increases in Depressive Symptoms, Suicide-Related Outcomes, and Suicide Rates Among U.S. Adolescents After 2010 and Links to Increased New Media Screen Time.”

⁶³ McBride, “Daily Digital Technology Use Linked to Mental Health Symptoms for High-Risk Adolescents.”

⁶⁴ McBride.

⁶⁵ Radovic et al., “Depressed Adolescents’ Positive and Negative Use of Social Media.”

correlations to increased digital media use and the emotional wellbeing of high-risk adolescents, both studies cited that there were negative outcomes reported by the participants after social media use. The McBride study cites that, “This positive outcome could also be the result of digital technology helping to distract participants from negative symptoms or feelings, according to the authors of the study. Further research is needed to test whether these findings are generalized beyond this high-risk sample... This study focused on adolescents who were already at risk for mental health issues, so it is difficult to say what effects spending long periods of time using technology could have on the mental health of young people in general.”⁶⁶ Similarly, the Radovic study, titled “Depressed Adolescents’ Positive and Negative Use of Social Media,” cites:

As was expected, adolescents also shared ways that their SM (*social media*) use results in negative consequences. These included negative social interactions such as comparing themselves to others and cyberbullying, sharing risky behavior, and posting negative content or using SM for negative ways to cope with mood. Research supports that using SM may lead to holding the belief that others have happier lives (Chou & Edge, 2012); in a longitudinal study of adolescents, the relationship between negative online comparisons was reciprocal with decreased life satisfaction (Frison & Eggermont, 2016). Therefore, depressed adolescents with less life satisfaction may be more prone to negative online social comparisons and this may further worsen their life satisfaction even as these comparisons are unlikely to be based on reality. About 40% of adolescents feel the pressure to curate their profiles, deleting and retaking photos, deleting others' comments, or even entire accounts, to portray themselves in a desired way (Madden et al., 2013). Growing evidence supports that cyberbullying, specifically cybervictimization, is associated with depression (Daine et al., 2013; Rose & Tynes, 2015; Tennant, Demaray, Coyle, & Malecki, 2015) and with SM use in a dose-dependent way (Sampasa-Kanyinga & Hamilton, 2015b); in addition, cybervictimization may mediate the relationship between SM use and psychological distress (Sampasa-Kanyinga & Hamilton, 2015a). Adolescents use SM to share risky behavior such as

⁶⁶ McBride, “Daily Digital Technology Use Linked to Mental Health Symptoms for High-Risk Adolescents.”

sexual and profane language (Williams & Merten, 2008); at times this exposure then translates into real life risky behavior, as is with substance use (Cabrera-Nguyen, Cavazos-Rehg, Krauss, Bierut, & Moreno, 2016).⁶⁷

Though the research is mixed, what is not disputed is that social media use has an impact on adolescents and experts still are not clear if these implications have a positive or negative effect on high risk teens.

Screens and online posts provide a false sense of protection for users. As such, some teens are more compelled to post content about themselves and others that they would never share or say in person. Though social media can be a useful platform for processing the challenges of being a teenager, adolescents report that not all of their experiences online have been supportive, helpful, and kind. In fact, according to a 2022 Pew research study, nearly half (49 percent) of all teens ages 15-19 experienced cyberbullying and they feel it is a major problem for their peers.⁶⁸ In this study, cyberbullying is measured by six distinct behaviors including:

- Offensive name-calling
- Spreading of false rumors about them
- Receiving explicit images they didn't ask for
- Physical threats
- Constantly being asked where they are, what they're doing, or who they're with by someone other than a parent
- Having explicit images of them shared without their consent⁶⁹

The most common type of harassment teens experience is offensive name-calling with thirty-four percent of teens surveyed reporting they have been called offensive names online or via their cell

⁶⁷ Radovic et al., "Depressed Adolescents' Positive and Negative Use of Social Media."

⁶⁸ Atske, "Teens and Cyberbullying 2022," December 15, 2022.

⁶⁹ Atske.

phone. The study also showed that older teen girls stand out for receiving multiple types of harassment and black teens are more than twice as likely than Hispanic or White teens to think their race or ethnicity has made them a target for abusive behavior online.⁷⁰ Studies such as these highlight the significance of online harassment and bullying in the lives of teens.

Further research and studies have examined the impact of cyberbullying on the mental health of teens and have found that teens with greater social media use related to online harassment had higher depressive symptom scores.⁷¹ A study published in the *European Psychiatry* that looked at the impact of cyberbullying victimization on mental health problems of adolescents, such as psychological distress, suicidal ideation, and attempts found that the “...cyberbullying victimization is a significant factor in the associations between the use of SNSs [Social Networking Sites] and mental health problems.”⁷² These actions have real and serious consequences on the victim. A 2018 study that examined the impact of SNS on the mental health of adolescents found:

“The current study extended this line of inquiry by contrasting the magnitude of the effect of cyberbullying victimization on adolescents’ emotional and behavioral problems, compared to other forms of bullying victimization. For females, cyberbullying victimization had a significantly stronger association with emotional problems than verbal and physical bullying. For males, the effect of cyberbullying on emotional problems was stronger than physical bullying. For both sexes, cyberbullying had significantly stronger associations with behavioral problems than other forms of bullying. Our findings suggest a unique, negative effect of cyberbullying victimization on adolescent mental health and that the magnitude of the effect is comparable, and in some instances, stronger than more traditional forms of bullying victimization.”⁷³

⁷⁰ Atske.

⁷¹ Kelly et al., “Social Media Use and Adolescent Mental Health.”

⁷² Sampasa-Kanyinga and Hamilton, “Social Networking Sites and Mental Health Problems in Adolescents.”

⁷³ Kim et al., “Cyberbullying Victimization and Adolescent Mental Health.”

Screen-based technology provides a barrier that prevents individuals from physically witnessing the harm they cause when they emotionally target another. These experiences can cause pain and trauma for the victim, which the aggressor may feel a disconnect from as these experiences are occurring in a virtual world.

Another layer of cyberbullying that is not yet as commonly addressed by researchers is that it is happening out of the view of adult eyes. In my work as a dean of students, I felt I was likely missing seventy-five percent of students' social interactions because the majority of their social exchanges were happening online. Unless I was connected to every student's social networking sites, I had a very little chance of witnessing how they were treating one another online.

What I've observed when working with students is that adolescents often do not want to come forward with information about cyberbullying. Whether they are a victim, or they know someone who is being targeted, many students believe that bringing this information to light will only make the situation *worse*. Many students witness acts of cruelty, hate, and unkind behavior online and do not feel empowered to act or intervene. There have been a number of times when students have approached me with concerns about the wellbeing of other students at the school after seeing negative posts about them online. The students who come forward are usually students who are older, have more social power, and are less likely to be targeted by the alleged bully in this situation. These students take screenshots of comments, pictures, or videos to show what it is they are seeing online. It is in these moments I am grateful for the empathy, compassion, and bravery of these students.

The impact of cyberbullying and harassment can have serious consequences. Dr. Nicolas Kardaras writes in his book, *Glow Kids*, about the heartbreaking effects this type of online

behavior can have on teens who may already be isolated and/or vulnerable. He writes, “Unfortunately, social media *amplifies* already existing young-female dynamics. Insecurities are magnified. Mean Girl cyberbullying attacks are tweeted and retweeted in a virtual echo chamber as social media decreases the quality of socialization and increases isolation. So-called Facebook depression and epidemic levels of female teenage suicides linked to social media cyberbullying are all byproducts of this social media phenomenon...In fact, many young people who get referred to me for suicidal ideation are feeling that way because of some type of social media trouble—cyberbullying, sexting gone wrong, being defriended by key friends.”⁷⁴ A 2021 report by the U.S. Surgeon General’s Advisory titled *Protecting Youth Mental Health* outlines the stark reality of the current mental health crisis teens face today. In it they write:

Unfortunately, in recent years, national surveys of youth have shown major increases in certain mental health symptoms, including depressive symptoms and suicidal ideation. From 2009 to 2019, the proportion of high school students reporting persistent feelings of sadness or hopelessness increased by 40%; the share seriously considering attempting suicide increased by 36%; and the share creating a suicide plan increased by 44%...Between 2007 and 2018, suicide rates among youth ages 10-24 in the US increased by 57%. Early estimates from the National Center for Health Statistics suggest there were tragically more than 6,600 deaths by suicide among the 10-24 age group in 2020.

It’s also important to acknowledge that the prevalence of mental health challenges varies across subpopulations. For instance, girls are much more likely to be diagnosed with anxiety, depression, or an eating disorder, while boys are more likely to die by suicide or be diagnosed with a behavior disorder, such as attention deficit hyperactivity disorder (ADHD). In recent years, suicide rates among Black children (below age 13) have been increasing rapidly, with Black children nearly twice as likely to die by suicide than White children. Moreover, socioeconomically disadvantaged

⁷⁴ Kardaras, *Glow Kids*. (p. 98)

children and adolescents—for instance, those growing up in poverty—are two to three times more likely to develop mental health conditions than peers with higher socioeconomic status.⁷⁵

The trends and numbers captured in this report are staggering, and though these numbers were taken during the COVID-19 pandemic, the reality is that rates for adolescent sadness, anxiety, depression, and suicidal ideation were already rising at alarming rates prior to the pandemic. A 2022 report by the *National Institutes for Health* cited a study in which approximately 170,000 U.S. teens between the ages of 12-17 were surveyed annually on their mental health between 2009 & 2019. Their findings reported, “Rates of adolescent depression increased from 8.1% in 2009 to 15.8% in 2019...”⁷⁶ The researchers also found that though rates of depression increased for both genders, females reported a greater change (12%) versus males (3.7%).⁷⁷

The concern over the negative behavior and impact of social media have reached policy makers. A number of U.S States have taken measures to help protect adolescents against cyberbullying by creating and enforcing strict regulations against these types of behaviors. For example, Massachusetts’s *Section 370: School bullying prohibited; bullying prevention and intervention plans; reporting of bullying incident date* has specific wording and definitions around cyberbullying.⁷⁸ In fact, as a faculty member at a boarding school in Massachusetts, we are required by law to review these policies with our students each year and to submit our students’ signatures of acknowledgement that they have read and understood these policies.

The United States Congress, in response to growing concerns around the impact of social media on the mental health and wellbeing of adolescents, have created a bi-partisan federal bill titled *Protecting Kids on Social Media Act*, which would “set a minimum age 13 to use social media

⁷⁵ Office of the Surgeon General (OSG), *Protecting Youth Mental Health*.

⁷⁶ Wilson and Dumornay, “Rising Rates of Adolescent Depression in the United States.”

⁷⁷ Wilson and Dumornay.

⁷⁸ “Massachusetts General Law - Part I, Title XII, Chapter 71, Section 370.”

apps, and would require parental consent for 13 to 17 year-olds. The bill would also prevent social media companies from feeding algorithmically personalized content or advertising to users under the age of 18.⁷⁹ Though this bill was submitted to Congress in April of 2023, it has not yet made it into law. However, there are a number of states who have taken similar measures and made them state regulations. In 2023, the Utah State Legislature passed a bill to enact the *Utah Social Media Regulation Acts*. Starting on March 1, 2024, social media companies must:

- Verify the age of a Utah adult seeking to maintain or open a social media account
- Get the consent of a parent or guardian for Utah users under age 18
- Allow parents or guardians full access to their child’s account
- Create a default curfew setting that blocks overnight access to minor accounts (10:30 pm to 6:30 am) which parents can adjust
- Protect minor accounts from unapproved direct messaging
- Block minor accounts from search results
- In addition, social media companies:
 - Cannot collect a minor's data
 - Cannot target minor’s social media accounts for advertising
 - Cannot target minor’s social media accounts with addictive designs or features⁸⁰

The examples of the legal steps taken on both state and federal levels reflect the urgency for regulation around social media use for teens. These actions have been in response to the outcry of concerns from medical experts, researchers, caregivers, and adolescents themselves. From my observations as an educator, the mental health of the students I work with is at a critical state. Anecdotally, at my current school, the number of medical leaves due to mental health concerns between 2015-2020 was between three and six students per year, whereas in the past three years

⁷⁹ “Opinion | We Are Senators from Both Parties. It’s Time to Protect Kids on Social Media.”

⁸⁰ “Utah Social Media Regulation Acts.”

we have seen medical leaves jump to 20-30 students per year, with the majority of these leaves due to suicidal ideations or suicidal attempts. Though there are many reasons a student may feel or be suicidal, especially given the challenges of the climate they are growing up in, including the COVID-19 pandemic, academic pressures, climate change, racial injustice, policy changes that restrict the rights of girls and women and members of the LGBTQ+ communities, the high number of hours adolescents spend online consuming posts, images, and videos is a reality that cannot be overlooked as a factor in their overall wellbeing.

Part III: Relationships, Sex, Pornography & Social Networking Sites

When I first began working in boarding schools in 2004, I started as an intern at a school for students who identified as female, working in a variety of departments, coaching, and serving as a dorm parent. The very real thought of “being in charge” of 13-18 year olds was terrifying as a 23 year old recent college graduate. On my first night of dorm duty, I carried the school’s student handbook around with me as I monitored studyhall and fielded questions from new and returning students. While I had been a boarding school student in high school, I was on the other side now, and the only way I was going to get through that year was to memorize the handbook from cover to cover.

Though I was still far from committing the document to memory, having the instincts to reference the handbook in a moment of panic came in useful when I received a knock on my apartment door only a few weeks into school. Though I was not on duty, I decided to answer the knock and was surprised to find Suvi, a new 9th grade student from Singapore, on the other side of the door. She looked alarmed and in need of help. I invited Suvi in and asked if everything was okay. *No*, was all Suvi was willing to share for quite some time. Not quite sure what to do in this situation, I

proceeded to gently layer question after question on Suvi, hoping to get some sort of context for the reason for her visit and what it was that had left her speechless.

The situation had to do with Suvi's roommate, Laura. Laura was also a new 9th grader, who was proving to be challenging both in and out of the classroom. Laura believed in witchcraft and that she was a witch who could yield powers and magic over others. Laura's dark dress, black lipstick, and metal spiked collars stood out among the jeans, sweatshirt, and flip flop crowd of new girls. Feeling socially isolated and criticized by her peers, Laura lashed back by telling other students she had put a curse on them and that they had better watch out. Whether real or made up, I was not the one to say, but Laura seemed to believe in her magic abilities and she was starting to scare some of the other students into thinking they may be cursed.

With this in mind, I thought Suvi was going to tell me about a new curse Laura put on another student, or even on her. I was not prepared for what Laura was actually doing that was upsetting Suvi, though as the acting adult in the situation, I was the one who was the first responder to the situation.

Suvi tried her best to describe to me the situation in her room. It appeared to her that Laura was taking topless nude photographs and putting them on the internet using her computer's scanning device. Since this was the age before iPhones or smart devices, people had to go to creative lengths to take real-time pictures to load onto the computer, never mind the internet. I ran downstairs to Suvi's and Laura's room, and when I entered, there was Laura topless, bent over, and pressed against the scanning machine. I quickly asked her to step away from her computer, get dressed, pull out her student handbook, and begin to write down all the school rules she was violating.

Thankfully, I was able to find the screen Laura attempted to minimize at the last minute so I could have a full understanding of what exactly was going on. Laura was in the middle of a conversation on a witchcraft chat room with a 30-something year old male, who also happened to be sharing pictures of himself fully nude and sexually aroused. I was relieved to know Laura could not see my expression as I absorbed the gravity of her actions and my disbelief at the content on her computer screen. Attempting to cover up my shock and disbelief, I proceeded to state again that Laura needed to copy down all of the rules she violated in the handbook, while I scrambled to come up with a plan to get another, more senior-level adult to help with the situation.

I decided to send Suvi, who accompanied me to the room, to go and call the administrator on duty (AOD). While waiting for help to arrive, I proceeded to ask Laura questions about her online behavior, including who the naked man in the chat room was. Did she know him? Where did he live? Laura quietly told me the man was a “friend,” whom she had known for a while. Though he lived in Alaska, they talked every day and he was her best friend. I wanted to know if the man knew Laura was a 9th grade student at a boarding school, and Laura said he did, he even knew which boarding school she attended. At this point, my skin began to crawl and a wave of nausea hit my stomach. Not only was a thirteen year old girl sharing and receiving nude, sexually explicit photographs with a 30-something year old man, he also knew her exact location and the location of over three hundred other young women.

At the time of my situation with Laura, I had been superficially aware of the dangers of chat rooms. Though I understood why it might be helpful for teens such as Laura to build connections with others who might be experiencing similar struggles to their own, there was only one lens through which I could view the intentions of the male “best friend from Alaska.” The internet has allowed for many positive and productive experiences with one another, however there can also

be a dark side to online exchanges, such as what happened to Laura. These experiences may cause harm to adolescents, such as child sexual exploitation, cyberbullying and harassment, psychological distress, and unlawful acts. For teens, their stage of adolescent development makes them vulnerable to impulsive behavior, which may stem from insecurities, loneliness, curiosity, sexual exploration or other psychological or emotional factors.

Stella was the very first student I met when starting my new job as Dean of Students at a girls' boarding school in western Massachusetts. She came to school in the summer with her dad and her sister to drop off school registration paperwork. With tanned skin, dirty blonde hair, and brown eyes, Stella looked like a typical boarding school teen. Though Stella looked athletic, she detested anything that made her run and would rather be building sets or acting on stage. I was immediately drawn to her warm personality, great eye contact, and her complete excitement for her new school. Though Stella held great confidence, there were moments of self doubt when she struggled to tell me how her summer was going, due to her significant stutter. As our conversation wore on, Stella became more relaxed as she asked me questions about her roommate and advisor, and I learned that Stella's stutter ebbed and flowed depending on her nerves.

The student who was now sitting in front of me for breaking a handful of major school rules, was only a shadow of her former self. Now a junior, Stella was hardly recognizable, with pink, blue, and purple hair; heavy layers of makeup on her face, especially around her eyes and lips; clothing that was frayed and torn; and most concerning of all, Stella's thin, skeletal frame—a shadow of the strong, athletic looking girl a few years back.

The adolescent years are generally a time for self exploration for young people—a time to try on new personas and images. As an educator, I've seen hundreds of teens grow and change from young, awkward 13 year olds to become self aware and capable 18 year olds. This process

requires growth and often involves bumps—sometimes major ones—along the way. Adolescence is a time of absolutely knowing who you are one hundred percent in one moment and then hardly recognizing your own reflection in the next. For caregivers and educators, this can also be a gut wrenching and terrifying time as children gain independence, try new experiences, and practice their first moments of young adulthood, sometimes taking risks that can put them in harm's way.

This was exactly what happened one April evening, when I received a call on the administrator on duty (AOD) emergency cell phone from our local police department's dispatcher. She was calling to notify me that two police cruisers were on their way to campus after receiving a 911 call from a student named Stella who was hiding in the woods after being approached by an unidentified man. The dispatcher then went on to say that the student had hung up on the call because she was afraid the man was looking for her and that the light (or audio) from her cell phone might disclose her location. This was when the dispatcher called the AOD phone (as a boarding school, we share our emergency phone numbers with our local authorities) to see if we could get immediate support for the student until the cruisers arrived.

When I hung up with dispatch, I quickly dialed our school's security team and asked them to meet me out by the soccer fields, as this was the last approximate location Stella had given the dispatcher before she hung up. When I reached the parking lot for the athletic complex, the security car pulled alongside me and we drove together out to the soccer fields, with blue and red lights flashing in our mirrors, as two police cruisers made their way towards us.

When we got to the soccer fields and got out of our vehicles, the officers began to shine their lights both over the turf grass and along the perimeter of the woods. Security left me with the officers so they could secure the doors to our main building and to alert the dorm staff to have students shelter in place. While the police and security continued to support the situation by

looking for the student and the male adult and to secure the campus, I decided to track down Stella's cell phone number using the school's mobile database. Thankfully her number was in the system and with panic gripping my stomach, I dialed Stella's number. She answered on the first ring. Choking back a sob as she whispered *hello*.

I told Stella as calmly as I could that it was Kristen Peterson and I was the AOD. I was calling her from the soccer field and I was with the police. I asked her if she could see the lights from the flashlights and cruisers and confirmed she could. I also asked her if she knew where the man who she was hiding from was and she said she did not but that she thought he had left. I then asked Stella if she could come out of the woods and that we would meet her so that we could walk back to the building together. Stella and I stayed on the phone while she bravely emerged from her hiding spot and walked towards the officers. By the time I reached Stella, her sobs were uncontrollable, as was her shaking. I wrapped my arms around Stella's shoulders and guided her to the nearest building where she gave both me and the officers an account of what had happened.

Social media platforms have also become a way for teens to explore their sexuality and to meet potential partners either for romantic relationships or for noncommittal sexual hook-ups. With Stella's situation, for the past few months she had been using online dating apps (such as Tinder and Bumble) to meet men in the area, as it was difficult for her to have these experiences being a straight, cisgendered boarding student at an independent school for female identifying students. Having to navigate rules that prohibited students from having outside guests in dormitories and sexual behavior on school property, Stella had to get creative. She found it easiest to skirt these policies by meeting the individuals she met online in the school's parking lot outside the gym during the evening hours. This was a space that had little to no adult presence and it made it easy for Stella to use the night setting to bring her sexual partner into the gym building, behind the gym building, or even to go into the individual's car to hook-up. Stella had also timed her

experiences to be during the hours of study hall (8:00-10:00 p.m.), when students were permitted to travel to the library, the art center, or the dance studio, which was conveniently located in the gym. For weeks, Stella had been “signing out” of study hall to go practice at the dance studio, only to be meeting her online dating matches in the parking lot outside the building.

Although Stella’s previous online connections had been going relatively smoothly (nevermind the school rules she was breaking), her use of online dating apps to meet strangers and to hook up with them in various places on school property was high risk sexual behavior. As a 17 year-old, Stella lied about her age when she created her online dating profile—something that is common among teens, even though online dating apps have restrictions to keep underage users off their sites—as she believed the benefits of using the apps outweighed any possible consequences.

Unfortunately for Stella, her most recent Tinder “match,” which she thought was a 20 year-old college student who had driven from a nearby university to meet her, turned out to be a 40-50 year old man who had tried to convince Stella to follow through on the hook-up even though she did not want to. Feeling scared for her safety, Stella did the only thing she could think of and fled to the woods.

Online dating apps have become a mainstream way for adults to meet one another, whether for romantic interest or for casual sex. However, though these apps have regulations that prohibit users under 18 from using their services, teens eager to explore their sexuality have found ways around these restrictions—restrictions critics claim are “virtually impossible” to monitor and implement, which may also fail to protect minors from potential sexual predators.⁸¹ According to an article in *The Atlantic* magazine, which examined teen use of online dating apps, “The *GBH News Center for Investigative Reporting* found that from 2015 to 2021, more than 100 men—including police officers, teachers, and priests—were charged in the United States with

⁸¹ II, “The Teens Slipping Through the Cracks on Dating Apps.”

crimes related to sexually assaulting minors or attempting to engage in a sexual act with a minor through Grindr [Grindr is an online dating app for the LBBTQ+ community].”⁸² The article also shared that, “Similarly, the United Kingdom’s *Sunday Times* has reported that, from 2015 to 2019, there were at least 30 cases of child rape and 60 cases of children being otherwise sexually exploited on dating apps in the U.K.”⁸³ Though we never discovered who the individual was who came to campus to meet Stella that night, the school remained on edge for days not knowing if the man would come back. In partnership with Stella’s family, she took a leave of absence to get medical and emotional care for her recent trauma. While at home, Stella connected with her therapist to talk about her online behaviors and the dangers she was putting herself in by meeting older men for casual hook-ups in dark and remote areas of campus.

Stella’s story is just one of the many experiences I have had in helping students to understand the realities of the potential risks and dangers that can come with online dating apps, especially for underage users. Though not all teens are using apps for casual sex, today’s adolescents engage and explore their sexuality and their romantic relationships using other online platforms, some of which—as what we saw in Stella’s case—can have unintentional and harmful outcomes.

As a health education teacher, I am also aware that teens with lower self esteem and/or body image are more likely to engage in risky sexual behavior, which can include behaviors such as *sexting*—the action or practice of sending, receiving, or forwarding sexually explicit photographs or messages mostly via mobile phone, computer, or other digital device.⁸⁴ According to a 2018 report published in *JAMA Pediatrics*, one out of every four teens receive sexually explicit texts and emails, at least one out of seven send sexts, and more than one in ten teens forward sexts

⁸² II.

⁸³ II.

⁸⁴ “Sexting | Facts, Information and Advice On the Consequences.”

they've received without consent.⁸⁵ Though this study analysis was conducted prior to the COVID-19 pandemic, which forced adolescents to stay home and moved (almost exclusively) their social interactions online, it is likely these numbers are higher, though more research in this area is needed to get a full scope and scale of teen sexting today.

As part of my health education curriculum, my students and I talk about the impact and reality of asking for, taking, sending, and distributing nude images of individuals under the age of 18. What may seem like a quick, flirty, and private image shared between two teens may become a much larger issue with serious consequences. For example, any nude image may be shared with others or posted online without the consent of the person in the photo, which is a serious violation of privacy. Further, if the image is of someone under the age of 18, it is considered child pornography, which is a crime. Though we discuss at length sexting, or sending “nudes” as the students prefer to say, I am still always in disbelief to hear the number of students who have been asked by another teen for a nude, who have sent nudes, or who have received nudes. During one of my classes, nine of the 11 students claimed to have fallen into one of these three categories, with one student sharing that a boy asked her for a picture of her breasts when she was just 12 years-old.

According to a 2022 Pew Research Center on *Teens & Cyberbullying*, the third most common type of bullying or harassment experienced by U.S teens (ages 15-17) was receiving explicit images they did not ask for (22 percent). This number was higher for females (25 percent) than for males (18 percent). This study also found that eight percent of adolescents in this same age range had explicit images of them shared without their consent, with girls having higher rates (nine percent) than boys (seven percent).⁸⁶ Though not all sexting between teens is a form of

⁸⁵ Madigan et al., “Prevalence of Multiple Forms of Sexting Behavior Among Youth.”

⁸⁶ Atske, “Teens and Cyberbullying 2022,” December 15, 2022.

cyberbullying or harassment, medical experts, researchers, and caregivers agree the impact of a sext gone wrong can cause emotional and psychological harm, which can affect the adolescent in a myriad of ways including in their relationships with their families, their friends, and their peers. They may have a difficult time being at school or in their community. Sexting can also affect a teen's sense of self worth and lead to feelings of guilt, shame, or despair.

A number of studies have examined the correlation between sexting and mental health among teens. Though the results have been inconclusive, researchers are concerned about the prevalence of adolescent sexting and are calling for more studies to be done. A 2019 study published in *The Journal of Psychology*, which examined the relationship between sexting and psychological distress in adolescents wrote, "...our study also raises the question of a deeper understanding of the mechanisms underlying the relationship between sexting and psychological difficulties. We believe that the presence of different individual and situational factors (see Sesar, Dodaj, & Šimić, Citation2019) likely plays a significant role in the relationship between sexting and mental health, on the stability of sexting and on the stability of mental health problems among sexters over time."⁸⁷ Some researchers have already learned that adolescents who sext, are more likely to engage in risky sexual experiences such as having unprotected sex. A study published in the *American Academy of Pediatrics* cites that sexting "appears to be part of a cluster of risky sexual behavior among adolescents" and that "nonheterosexual teens were more likely to report sext, sexual activity, and unprotected sex at last sexual encounter."⁸⁸ From a behavioral health perspective, this is reason for concern and the study urges pediatricians to be "engaging patients in conversations about sexual activity, prevention of sexually transmitted infections, and

⁸⁷ Dodaj, Sesar, and Jerinić, "A Prospective Study of High-School Adolescent Sexting Behavior and Psychological Distress."

⁸⁸ Rice et al., "Sexually Explicit Cell Phone Messaging Associated With Sexual Risk Among Adolescents."

unwanted pregnancy.”⁸⁹ The researchers also recommended that health education classes in schools include sexting and its associated risks in their curriculum.

Even when schools include discussions around sexting and risky sexual behavior, it does not always prevent students from engaging in these experiences. Studies have cited that adolescent females (more so than males) are more likely to experience pressure from boys to take and send nude images of their bodies. A 2012 article in the *Journal of Children and Media* titled, “Damned If You Do, Damned If You Don’t...If You’re a Girl: Relational and Normative Contexts of Adolescent Sexting in the United States,” reported that though girls and boys reported similar rates of sexting, girls were more likely to receive pressure from boys to do so.⁹⁰ Further the study also found that “girls were commonly judged harshly whether they sexted (e.g., “slut”) or not (e.g., “prude”), whereas boys were virtually immune from criticism regardless.”⁹¹ Though this study is from more than decade ago, as an educator I continue to hear from female students that they consistently face pressure—and at times harassment—from male students to send them nudes. The students express to me their outrage at how if they say no to these requests, they are then targeted online with comments calling them offensive names such as “ugly” or “fat.” When asked why these students do not come forward to an adult with this information, they tell me that this happens all the time and nothing ever happens to these students. Female students say these types of comments are constant and that it is easier to just let it go for fear of retaliation. An 11th grade girl even said to me this past winter, “Sometimes Kristen, it is easier to just give in so the boy will leave you alone.”

Unfortunately, this was the case for Navya, a student leader who was known for her academic and athletic talents, as well as her passionate desire to talk about the difficulties of being a teen.

⁸⁹ Rice et al.

⁹⁰ Lippman and Campbell, “Damned If You Do, Damned If You Don’t...If You’re a Girl.”

⁹¹ Lippman and Campbell.

Navya was a boarding student from New Hampshire where her parents owned and operated an organic farm. Her father had grown up on the farm and spent his whole life in the area. Navya's mother was originally from India, though she had spent her adult life in the United States attending both undergraduate and graduate schools in the midwest and the northeast. Together they adopted Navya from a remote part of southern Asia and raised her in the quiet rural setting of the White Mountains.

With rich dark hair and wide auburn eyes, Navya was petite in stature standing a little over five feet tall, though her quick wit and speedy comebacks gave her a much larger presence at the school. Over the course of Navya's time as a student, she and I developed a close relationship and together we started a support group for girls to talk about their experiences living at and attending a boarding school. It was during one of our group meetings that Navya shared with her peers an incident that happened to her during her junior year. Though Navya and I had spoken privately before about her experience, I was in awe of her courage to share her vulnerabilities with the group. She went on to describe a relationship she had with a boy from her class and their video exchanges during one of the school breaks. The boy's name was Henry and he was from an affluent town in New England. Navya and Henry had been classmates and friends for a while and Navya felt there might be something more than just friendship growing.

When Navya and Henry were home on break, they stayed up late one night, talking on Snapchat through its live video chat feature, which is similar to talking on platforms like Facetime or Zoom. They were both in their bedrooms and because of the late hour, they assumed their parents had already gone to bed. The conversation was casual and flirty, which seemed to be the case with most of their recent connections. However it caught Navya off guard when Henry unexpectedly asked Navya if she would show him her breasts. Navya couldn't tell if Henry was joking or not so she asked him, *are you serious?* Up to this point, Navya and Henry had never directly expressed

romantic feelings for one another. They were not dating and they were not a couple. So, Henry's request for Navya to show him such an intimate part of her body was off-putting and confusing. Did Henry really like Navya or was he just using her so she would send him a nude? Navya wasn't sure how to react. On the one hand, she was starting to have romantic feelings for Henry and she wanted to keep talking to him. Yet on the other hand, she was so offended by his bold request that she felt repulsed. Navya finally said no.

Unfortunately, Henry did not accept this answer and proceeded to ask Navya again and again if she would show him her breasts not only in their next conversation, but in every conversation they had that week. For Navya, the pressure grew to be too much and she finally relented. Navya wanted Henry to stop asking and she felt the only way to get him to do this was to give him what he wanted. Before doing so, however, Navya made Henry agree to two things, the first was that she would keep her bra on and the second was that Henry could not record their conversation (which is a feature in Snapchat's live video chat).

Though Henry agreed to both of these stipulations, while Navya was pulling up her shirt, she caught a green light on the video screen out of the corner of her eye. Navya's hands and her shirt flew down as she sputtered, *are you recording this? Did you just record me?* When Navya looked back at the screen, the green recording light was gone but she was certain that she had just seen it a few moments earlier. Though Henry swore to Navya that he did not record her, she did not believe him. Distraught by the situation, Navya ended her relationship with Henry and reached out to her closest friends to tell them what happened. She began to obsessively monitor Henry's social media accounts, as well as those of his friends, to see if there were any hints that Henry might have shared the video recording with others. Though Navya never saw any proof, when the students returned from break, rumors began to spread about what happened between them that night. Navya claimed she experienced whispers and giggles when she walked by groups of

students in the dining hall. She also noticed other boys at school—boys she had never interacted with before—were suddenly seeking her out on her social media to ask her to hangout. Navya believed that Henry had likely shared the video with some of his friends and this betrayal of trust hurt her in social, emotional, and psychological ways. Navya’s family ultimately learned of the situation and alerted the school, which did an investigation into the events. Though the results of the school investigation were kept confidential, Navya felt her privacy was irretrievably violated and she was left grappling with feelings of regret, shame, anger, and sadness.

I share this story to illustrate the complex social dynamics teens can face when navigating adolescent relationships and the ways their social media and technology use may exacerbate situations. As Dr. Frances E. Jensen captures in her book, *The Teenage Brain*, adolescents have always been impulsive and committed careless acts, however “the digital tools now at their disposal have exponentially magnified the dangers and certainly the consequences of those careless, impulsive acts.”⁹² As outlined earlier, girls report experiencing pressure to send sexts at higher rates than boys (and these requests often come from boys), which was the experience Navya had with Henry. What also made this moment even more complicated was that Navya believed Henry may have recorded the moment when she was exposed. Not only would this have violated Navya’s trust, but it also had the potential to violate her privacy if Henry chose to share the video without Navya’s knowledge or consent. Though this discussion does not get into any potential legal aspects of this situation, lawmakers around the world are trying to crack down on the distribution of material that is sexually exploitative of adolescents. In 2015, a video of two 15 year-olds engaged in sexual activity at a party went viral in Denmark. Three years later, prosecutors charged over 1,000 teenagers who shared the video on Facebook with distributing child pornography. One of the prosecutors in the case stated that they wanted to use this case to set a precedent for future cases citing, “This is illegal. It's illegal to destroy other people's lives by

⁹² Jensen, *The Teenage Brain*.

spreading material in an intimate situation without consent. It's illegal.”⁹³ At the time of the event, Navya felt that her life had been destroyed by the potential sharing of a private moment between her and Henry. Though Navya has grown since this event, the trauma she experienced is something she continues to process.

Conclusion

While traveling with my family last summer, we found a playground at a local park to let our children release their energy and for the parents to stretch their legs. The facility was beautiful, nestled between two vast mountain ranges, it had a variety of resources including a community pool, three play structures, tennis courts, a walking path, and a skatepark. While my husband and I unloaded our children from their carseats, two teens ripped by on their skateboards. They seemed to be about fourteen years old and I couldn't help but notice one of the boys held a cell phone in his hand, which he continually glanced at every few seconds, even though he was traveling at high speeds, without a helmet on, in a parking lot. With my stomach in knots, I couldn't take my eyes off of the boy until I saw he had safely arrived at the skatepark, which was on the other side of the parking area.

Once their feet hit the ground, my children tore off toward the multicolored slides, climbing walls, and jungle gyms calling for my husband and me to follow. Though my feet took me toward the chorus of giggles and screams, my eyes kept flitting back toward the skatepark. Maybe it was because I had been researching teen cell phone use for some time now, or maybe it was because it was the middle of the summer and I had not been around students for a few weeks, but I couldn't help but feel great sadness as I watched the boy sit at the top of the ramp, legs dangling down the smooth curved surface, while he stared blankly down at his phone. Meanwhile, the other boy

⁹³ Overgaard, “In Denmark, Viral Video Sparks Wave Of Child Pornography Prosecutions.”

(presumably his friend) continued to launch himself down the half pipe, rocketing back and forth from side to side. During our hour or so at the park, I saw the boy with the cell phone only actually ride his skateboard a handful of times and all of those halfheartedly, stopping each time to check his phone. The way in which this boy also engaged (or did not engage) with his friend was also concerning. Though they came together, the boys were virtually strangers in their interactions and rarely spoke or made eye contact.

As my family and I loaded back up and headed out on our journey, my mind stayed in that park for a large part of the day, thinking about the wellbeing of the boy with the cell phone. As an educator and mother, it is hard for me to see moments like the one at the skatepark, which in some ways can seem so small and insignificant. However, in a moment where this adolescent could have engaged with a peer, played physically and emotionally, and have been disconnected from any form of technology, this teen chose instead to spent the majority of his time (at least the 60 or so minutes I observed) plugged into a virtual world.

Throughout my research on the impact of technology on the wellbeing of adolescents, I have seen numerous medical experts and researchers advise that individuals should pay attention to the way they *feel* after they engage in a specific activity for any extended period of time. There is an overwhelming amount of evidence that the ways in which adolescents engage these platforms is having a negative impact on their mental health and wellbeing, their relationships with their peers, their sexual health and behaviors, and their social and emotional growth and development. Though this chapter discussed a variety of reasons why teens use technology and social networking sites, there are still many more ways adolescents use screen-based media that may be harmful to their social and emotional wellbeing, such as compulsive (video) gaming and addictive-like behaviors to online pornography. The stories shared in these pages outline

examples of challenges students I have worked with throughout the years, or experienced either directly or indirectly as a result of their technology use.

4 | Nature's Role as Healer

Introduction

Earlier chapters addressed many of the physical, social, and emotional challenges adolescents have experienced in the past 10-15 years and how their relationships with technology may have affected adolescent development and emotional wellness. Chapter four takes a deeper look into these trends—plus a few additional concerns about adolescent wellness not discussed in the previous two chapters—to see whether nature, specifically *time spent in nature*, can be a protective factor and/or help counteract some of the negative impacts of high technology use for teens.

As a middle child growing up on a farm in a rural part of Connecticut, my experiences with technology were not typical. My parents firmly believed in not having cable television, mostly because we couldn't afford the expense, but also because they were wary of the values the television shows portrayed to their young, impressionable children. We were allowed to watch movies or any of the free major network television channels our analog antenna received, which usually included CBS, Fox, NBC, and PBS. On the weekends as a special treat, I fondly remember the many trips my family took to Blockbuster movie rentals, where we would pick out one kid movie and one adult movie with my parents. When we got home, my dad would make popcorn and my mom would get the television and VCR ready. After taking our usual places on the living room furniture, my mom would hit “play” and our family movie night would begin.

When I was in high school, my parents brought home a desktop computer for my mom to do the accounting and payroll for their business. They also connected the computer to the internet with a dial-up modem that would usurp our phone line, limiting any incoming or outgoing calls. I was immediately drawn to the device and would spend time after school exploring how the computer

organized itself. No one in my family was computer savvy, so I took it upon myself to figure out the folders, how to save information onto floppy disks, and how to change the settings. Without any formal training, my computer sleuthing was naive and limited, though at the time, I felt I was manipulating a high-tech, high powered machine. There was no way for me to know that computers, and more specifically the internet, would become a highly powerful and risky area for adolescents to explore.

Though I enjoyed navigating the nuances of our home computer, I spent much of my adolescence outdoors. When I think back to my days as a teenager, I struggle to recall any classes or content taught in middle or high school, however I can clearly remember many moments spent with my brother and our neighborhood friends playing in the fields, combing the woods, and riding around on two wheels. Even during my most challenging moments of childhood, I sought the comforts and solitude of nature. As a young woman grappling with the onslaught of puberty—hormonal acne, a changing body, and mood swings—my only escape came when I sat quietly under a lone tree, which stood in the field across from our house, breathing in the soft breeze and gazing to the cool woods below. Some of my most pivotal moments of development and identity happened under the shade of that maple tree.

As a boarding school student myself, my classmates and I would play outside every day. Whether with an organized athletic team or during our free time on weekends, getting out of the dorms and academic buildings was our priority. This could have been partly because we wanted to escape the watchful eye of the faculty, but more often than not, we simply wanted unstructured time to fish by the river, hike to the pinnacle, or run the back loop. Not being part of the “always on” generation, our time on technology was limited to places like computer labs. Assignments and papers could still be submitted with pen and paper, and being in a remote part of Connecticut, the only access students had to phones was the payphones in the dormitory hallways. Though our

daily routines were structured, the school's physical and social environments offered my classmates and me many opportunities for unstructured time to engage both physically and mentally with the natural world.

When I think back on my professional experiences, I have observed less and less of this type of play and student behavior over the years. Though the locations of the schools where I have worked have geographic similarities to those of my own boarding school, such as acres of beautifully wooded forests, natural water features, dozens of miles of trail networks, and a campus layout that highlights its natural surroundings, today's adolescents spend very little of their free time outside and engaged in the natural world. As the number of hours teens spend on screen-based devices climbs, with the current average being around eight hours each day, the number of hours students spend engaged in unstructured time outside only continues to decrease. Recent reports pin the average amount of time adolescents spend playing outside to four to seven minutes per day.⁹⁴

On a typical day, my students are constantly engaged with technology. This generation is labeled "always on" for good reason. Whether in class, during free periods, on the way to the practice field or dance studio, in their dorm rooms, for homework, or to communicate with their family or friends, students today are using technology more than they are doing anything else. As Winifred Gallagher, science writer, journalist, and former editor of *American Health* writes, "Your life is the sum of what you focus on."⁹⁵ What then, might be the implications for a young life focused on screens, social media, and various forms of technology?

⁹⁴ City, "Why Kids Need to Spend Time in Nature."

⁹⁵ Gallagher, *Rapt*.

It seems we are all too aware of the impact of high levels of technology use on adolescent wellness, but what about the impact of a lack of time outside on adolescent health? Author Richard Louv writes extensively on the effects of society's nature-deficit on childhood development—a term he calls *Nature Deficit Disorder*. Nature Deficit Disorder “describes the human cost of alienation from nature, among them: diminished use of senses, attention difficulties, and higher rates of physical and emotional illnesses.”⁹⁶ Louv's work demonstrates how the absence of nature in the lives of today's youth may be an underlying commonality for the disturbing trends in adolescent health. Further, Louv's research argues that children need direct exposure to nature for healthy childhood development and also as a way to improve and combat mental and physical disorders.

Since Louv's work was published in 2005, a number of studies have examined the relationship between the time spent in nature and its impact on the physical and psychological wellbeing of adolescents. Reports have shown that experiences with the natural world can:

- Reduce obesity, stress, and the incidence of clinical depression.
- Improve confidence and self esteem.
- Combat loneliness.
- Improve impulse control and boost immune function.
- Improve cognitive function, self-discipline, and resilience under stress.
- Improve academic performance (critical thinking, creativity, curiosity, and concentration).
- Moderate the effect of stressful events in children.
- Improve empathy and generosity.
- Build a strong sense of community, mutual trust, and a willingness to help others.

⁹⁶ Louv, *Last Child in the Woods: Saving Our Children from Nature Deficit Disorder*.

- Improve social interactions, foster social empowerment, enhance interracial interaction, and promote social cohesion and support.
- Lower rates of aggression, including violent and property crimes.
- Build a long lasting connection with the natural world.⁹⁷

Independent schools have an enormous advantage in helping their students to combat the negative effects of technology. Most boarding school campuses are steeped in nature and serve as prime locations for students to access time outdoors. Studies have shown that simply spending time outside in natural environments is restorative for attentional recovery and for reducing mental fatigue.⁹⁸ This means, for independent schools that have multiple academic buildings, even the walk outside between classes can help them recover from the mental fatigue they may experience during their classes. Even allowing students to take breaks outside during class can give their attention spans important rest and help them process information more efficiently. Unfortunately, as mentioned in a previous section, many students use their phones during downtime outside and when walking between buildings as a way to avoid awkward social interactions.

Beyond the ten minute passing window between classes, however, providing (or even requiring) opportunities for students to spend time in nature can help improve many of the negative physical, psychological, and social maladies schools are seeing in their students. According to a 2021 study that examined the experiences of adolescents in nature and its impact on their mental and physical health, nearly 88 percent of teens said they wanted to spend more time in nature.⁹⁹ The report found, “Among youth, many felt that spending time in nature positively impacted their mental health, with 51.6% mentioning that it made them “feel calm when I am out in nature”; 22.1% said that it relieved stress or “reduces my anxiety,” and 17.1% felt that being in nature

⁹⁷ Keniger et al., “What Are the Benefits of Interacting with Nature?”

⁹⁸ Keniger et al.

⁹⁹ Zamora et al., “Exploring the Beliefs and Perceptions of Spending Time in Nature among U.S. Youth.”

positively impacted their physical health and “makes me feel more active and in shape.”¹⁰⁰

Studies like these illustrate that adolescents recognize for themselves that they feel better after having experiences in nature.

Part I: Engaging in Nature for Physical Wellness

Nature can also serve as a protective factor against some of the musculoskeletal illness brought on by excessive screen use. A study out of Norway wanted to examine why medical experts were seeing higher reports of adolescents with neck and shoulder pain. The researchers found that 20 percent of Norwegian teens reported neck and shoulder pain and that screen-based activities increased the risk of these ailments. Interestingly, their report also concluded that physical activity was protective against these symptoms.¹⁰¹ Getting students outside increases the likelihood that they will be spending less time on their devices, which lowers the amount of time they are using screen-based technology; gets them more physically active (such as climbing, jumping, or even walking), which engages the muscular and skeletal systems that have numerous positive implications; and it may help change the future behavior of adolescents to increase their time outdoors as a way to feel physically better.

As shared earlier, ophthalmologists are seeing an increase in adolescents with myopia (nearsightedness), which studies have shown is likely due to excessive screen use coupled with less time spent outside. A 2017 study titled, *Time spent in outdoor activities in relation to myopia prevention and control: a meta-analysis and systematic review* concluded that “Increased time outdoors is effective in preventing the onset of myopia as well as in slowing the myopic shift in

¹⁰⁰ Zamora et al.

¹⁰¹ Myrtveit et al., “Adolescent Neck and Shoulder Pain—The Association With Depression, Physical Activity, Screen-Based Activities, and Use of Health Care Services.”

refractive error.”¹⁰² To further support this research, and as noted earlier, a 2020 report in the the journal of *Acta Ophthalmologica*, found that lower physical activity and more use of screen devices “contributed significantly” to the observed rise in myopia for youth. Specifically, adolescents double their risk of having myopia if they are physically active for less than three hours per week or if they use screen-based media more than six hours per day.¹⁰³ This study further shows that (outdoor) physical activity is a protective factor against this disorder.

For most adolescents, however, there is a steep decline in physical activity between the ages nine and fifteen. In the United States, one of the biggest factors driving the lack of time adolescents spend moving is that they have replaced many of their outdoor leisure activities with indoor activities that are predominately screen-based. Other adolescent disorders, though not discussed at length in previous chapters but important to discuss here, include obesity and attention-deficit/hyperactivity disorder.

Nationwide, roughly 22 percent of adolescents (ages 12-19) suffer from obesity, with Hispanic and non-Hispanic Black youth having higher rates than non-Hispanic White and non-Hispanic Asian youth.¹⁰⁴¹⁰⁵ Though independent schools generally serve higher-income populations, which tend to have lower rates of obesity (10.9 percent), boarding schools are composed of students from a variety of socioeconomic statuses, cultures, and races.¹⁰⁶ A number of students at independent schools are overweight or obese, which is an adolescent health concern independent schools must pay attention to. Adolescents who suffer from obesity are more likely to have risk factors associated with cardiovascular disease and diabetes, be admitted to a hospital, be

¹⁰² Xiong et al., “Time Spent in Outdoor Activities in Relation to Myopia Prevention and Control.”

¹⁰³ Hansen et al., “Low Physical Activity and Higher Use of Screen Devices Are Associated with Myopia at the Age of 16-17 Years in the CCC2000 Eye Study.”

¹⁰⁴ Arnett, *Adolescence and Emerging Adulthood*.

¹⁰⁵ “Childhood Obesity Facts | Overweight & Obesity | CDC.”

¹⁰⁶ “Childhood Obesity Facts | Overweight & Obesity | CDC.”

diagnosed with a mental health problem, and have bone and joint disorders than those who are not obese.¹⁰⁷ Since about 80% of obese adolescents remain obese as adults, they are more likely to face all the health problems that accompany obesity in adulthood (diabetes, stroke, heart disease, depression, etc.).¹⁰⁸

Based on the likelihood that an obese adolescent will become an obese adult, it is fair to say that not only does this health condition play a significant role in the child's immediate development, it is also a precursor for the individual's future wellbeing. Though lifestyle factors (diet, exercise, income status, etc.), genetics, and underlying medical conditions are some of the contributing factors to this condition, there is little doubt that the rise of excessive screen use for adolescents has been a roadblock in getting kids outside and being physically active. However, studies have shown that increasing an adolescent's time in nature helps them to engage in outdoor play. This can assist weight management by helping adolescents develop active bodies with better coordination, stronger muscles, and better endurance. Providing adolescents with access to nature can have a profound impact on their physical wellbeing and their weight management. A 2021 study in the *International Journal of Environmental Research and Public Health* found:

In one study of U.S. children, increasing greenness was associated with lower BMI z-scores and lower odds of increasing BMI z-scores between two follow-up times [76]. Another study of schoolchildren in Spain found that greenness and forest proximity were associated with lower prevalence of being overweight or obese [77]. One study found that street tree density was associated with lower obesity prevalence in New York City (U.S.) children; however, no association was found with park areas [78]. In an Australian study, the prevalence of being overweight was 27–41% lower in girls and boys who spent more time outdoors at the study baseline than those who spent less time outdoors [67]. Another study found that greenness was

¹⁰⁷ Sahoo et al., "Childhood Obesity."

¹⁰⁸ Arnett, *Adolescence and Emerging Adulthood*. (p.38)

associated with decreased risk of being overweight but only among those in areas with a greater population density [79].¹⁰⁹

Studies such as these help demonstrate that providing adolescents opportunities to engage in the natural world has been shown to be a protective factor against obesity, a way to help improve childhood obesity rates, and an important tool in improving their future physical health and wellbeing.

Part II: Outdoor Experiences and Mental & Emotional Wellbeing

Nature has also been shown to improve another area of concern for adolescent health and wellness, attention-deficit/hyperactivity disorder or ADHD. The statistics are alarming for the number of adolescents diagnosed with ADHD; it is one of the most common childhood neurodevelopmental disorders and a disorder many students at independent schools suffer from.¹¹⁰ ADHD is usually diagnosed between the ages of eight and 10, but the majority of children with ADHD still suffer from the disorder during adolescence. In 2016, roughly 6.1 million children between the ages of 2-17 were diagnosed with ADHD (parent-reported), which is approximately 8.4 percent of all U.S. children in this age range.¹¹¹ Gender also seems to play a role in who is more likely to be diagnosed, and statistics report that boys are four times more likely to be diagnosed with the disorder than girls.¹¹²

The effects of ADHD on adolescent wellbeing are concerning and a study in the *Journal of Clinical Child & Adolescent Psychology* reported “Children and adolescents with ADHD are

¹⁰⁹ Jimenez et al., “Associations between Nature Exposure and Health.”

¹¹⁰ Louv, *Last Child in the Woods: Saving Our Children from Nature Deficit Disorder*. (p.99)

¹¹¹ Danielson et al., “Prevalence of Parent-Reported ADHD Diagnosis and Associated Treatment Among U.S. Children and Adolescents, 2016.”

¹¹² Arnett, *Adolescence and Emerging Adulthood*. (p.298)

more likely to experience a variety of negative outcomes compared to their peers without the disorder, including lower academic attainment, impaired social functioning, increased risk of hospital admissions and injuries, increased substance use and risk of substance use disorder, and reduced income and participation in labor markets as adults.”¹¹³ Researchers have also found that excessive screen use can make ADHD symptoms worse, and though not the same as having ADHD, a 2018 study published in *JAMA* found that adolescents with frequent use of screen-based media might increase their chances of developing symptoms of attention deficit hyperactivity disorder.¹¹⁴ As medical journalist Janie McQueen writes, “Most of us know what it’s like to be riveted for a while to a screen, whether it’s a TV, phone, or tablet. But for children with ADHD, the pull is even stronger. Short attention spans crave the ever-changing menus of flashy graphics, sound, and action, delivered with the thrill of instant gratification. Electronics can send steady doses of dopamine – a neurotransmitter – straight to the brain’s reward center.”¹¹⁵ Further, the impact of screen use can affect individuals with ADHD long after they have put their screens away. Screen exposure before bed for adolescents with ADHD can also lead to sleep disruptions and can exacerbate behavioral symptoms the following day.¹¹⁶

Independent schools have many students who have been diagnosed with ADHD and the challenges of this disorder can make their experiences at these competitive, high-achieving institutions even more difficult. Boarding school environments require students to be mature and independent; to manage their own self-care including wake up times, laundry and nutrition; and to balance their academic and social needs, which can be extremely difficult for teens with executive functioning challenges. Though many students use prescription medication and/or psychological

¹¹³ Danielson et al., “Prevalence of Parent-Reported ADHD Diagnosis and Associated Treatment Among U.S. Children and Adolescents, 2016.”

¹¹⁴ Ra et al., “Association of Digital Media Use With Subsequent Symptoms of Attention-Deficit/Hyperactivity Disorder Among Adolescents.”

¹¹⁵ McQueen, Janie, “Childhood ADHD and Screen Time.”

¹¹⁶ Cavalli et al., “Screen Exposure Exacerbates ADHD Symptoms Indirectly through Increased Sleep Disturbance.”

services such as therapy to alleviate their symptoms, nature has also proven to be an ally in reducing the symptoms of ADHD. A 2013 study, which examined empirical evidence on the benefits of interacting with nature for adolescents with attention deficit disorder (ADD), found that children who spent time in natural outdoor spaces reported higher rates of attentional functioning and their ADD symptoms were significantly lower (when compared to staying indoors).¹¹⁷ Though this study is an example of just one cited, numerous medical and psychological studies are in agreement that time spent in nature helps to alleviate many of the struggles students with ADHD face on a daily basis.

Another area boarding school students struggle with is with their sleep; both managing the amount of sleep they have each night and their quality of sleep. Though there are some factors contributing to their sleep patterns that may be out of a student's control, such as high academic loads, established bedtimes, and the habits and behavior of a student's roommate, over the past 10 years, technology has become one of the biggest negative factors impacting adolescent sleep. As outlined in chapter one, the effect of blue light on adolescent sleep not only suppresses the production of melatonin in the brain (which delays the onset of sleep), but also has been shown to shorten sleep duration and limit the amount of deep sleep. The American Academy of Sleep Medicine recommends teenagers (13-18 years old) should have approximately eight to 10 hours of sleep per night.¹¹⁸ A recent national sample of high school students in grades 9-12 reported that seven out of every 10 high school students (72.9 percent) got fewer than the recommended eight hours of sleep per school night.¹¹⁹ The impact of chronic lack of sleep can have serious implications on adolescent wellbeing including "...higher risk of obesity, diabetes, injuries, poor mental health, and problems with attention and behavior."¹²⁰

¹¹⁷ Danielson et al., "Prevalence of Parent-Reported ADHD Diagnosis and Associated Treatment Among U.S. Children and Adolescents, 2016."

¹¹⁸ "Sleep in Middle and High School Students | Healthy Schools | CDC."

¹¹⁹ "Sleep in Middle and High School Students | Healthy Schools | CDC."

¹²⁰ "Sleep in Middle and High School Students | Healthy Schools | CDC."

The good news is that nature can be an effective tool in helping to improve sleep quality. A 2021 study published in the *Journal of Affective Disorders* examined the associations of daytime outdoor light and its associations on “mood, sleep, and circadian-related outcomes.”¹²¹ The results of their study found, “Each additional hour spent outdoors during the day was associated with lower odds of lifetime major depressive disorder, antidepressant usage, less frequent anhedonia and low mood, greater happiness and lower neuroticism, independent of demographic, lifestyle, and employment covariates. In addition, each hour of daytime light was associated with greater ease of getting up, less frequent tiredness, fewer insomnia symptoms, and earlier chronotype.”¹²² Another study reported that daily exposure to outdoor light can be used as “an effective and noninvasive therapeutic option with little to no side effects, to improve sleep, mood and general well-being.”¹²³ The best way for adolescents to get the benefits of outdoor light is to spend time outside during the day. This time should be screen free, so that adolescents can also get the benefits of nature that come by watching and experiencing that natural world around them. Using nature as a tool to help improve adolescent sleep (both duration and quality) will also likely improve their overall psychological wellbeing; simply put, we feel better when we sleep better.

Sleep is just one component affecting student wellbeing and the rate of students struggling with mental health issues such as stress, anxiety, depression, loneliness, and suicidal ideation only continue to worsen and are at alarming levels. A 2023 report released by the *Centers for Disease Control & Prevention* (CDC) found that in the past 10 years, all groups of teenagers report an increase in mental health issues and suicidal ideation.¹²⁴ However, girls and LGBTQ+ teens are experiencing these health issues at alarming (even record breaking) rates. For example, three out

¹²¹ Burns et al., “Time Spent in Outdoor Light Is Associated with Mood, Sleep, and Circadian Rhythm-Related Outcomes.”

¹²² Burns et al.

¹²³ Blume, Garbaza, and Spitschan, “Effects of Light on Human Circadian Rhythms, Sleep and Mood.”

¹²⁴ “U.S. Teen Girls Experiencing Increased Sadness and Violence.”

of every five teen girls in the United States reported feeling persistently sad or hopeless in 2021, which is an increase of 57 percent from 10 years ago.¹²⁵ A 2021 report from the *Youth Risk Behavior Survey* found that one out of every three teens seriously considered attempting suicide, which was an increase in 60 percent from 2011. Though there are limited studies that examine the association between time spent in nature and adolescent mental wellbeing, as the researchers in the article *What are the Benefits of Interacting with Nature?* write, “Despite the limitations of the reviewed studies [having limited studies that include children], it is clear that interacting with nature may deliver several positive psychological well-being benefits to children.”¹²⁶ Some of the positive benefits of time spent outdoors on mental health and wellbeing include an increase in self-esteem and mood; lower levels of stress, depression and anxiety; increased cognitive function (such as academic performance); increased levels of creativity and imagination; and the ability to perform mentally challenging tasks.¹²⁷

One way to help lower stress levels for teens is to simply get them outside (without screen-based devices). Many epidemiological studies have found that people who spend greater amounts of time surrounded by nature report better physical and psychological health than those who do not.¹²⁸ This is likely due to the restorative effect nature has on our overall wellbeing. Cleaner air, listening to the birds, watching leaves flutter in the breeze, and smelling the rich musty soil help our senses relax and recharge in ways that urban environments cannot, with its constant noise of traffic and construction, concrete structures, and dense populations. One study published in the *International Journal of Environmental Research and Public Health* found that for people who lived in cities, time spent in green spaces helped to reduce stress levels for both females and males. Interestingly for women, the higher the level of green space, the more women’s cortisol

¹²⁵ “U.S. Teen Girls Experiencing Increased Sadness and Violence.”

¹²⁶ Keniger et al., “What Are the Benefits of Interacting with Nature?”

¹²⁷ Bratman et al., “Nature and Mental Health.”

¹²⁸ van den Berg et al., “Visiting Green Space Is Associated with Mental Health and Vitality.”

levels were reduced.¹²⁹ The study wrote, “We conclude that higher levels of green space in residential neighbourhoods, for this deprived urban population of middle-aged men and women not in work, are linked with lower perceived stress and a steeper (healthier) diurnal cortisol decline.”¹³⁰ In fact, another study out of *Frontiers in Psychology* found that spending as little as 20 minutes outdoors, connecting with nature can lower stress levels.¹³¹

Using nature as a way to help students get better sleep and to reduce their levels of stress may also help students lower their risks of developing other mental health issues. A report from *Science Advances*, which examined the correlations between nature and mental health shared, “...impacts on sleep and stress may entail decreased risk for mental illness, as sleep problems and stress are major risk factors for mental illness, especially depression. In addition, there is growing evidence that nature experience is associated with a decreased incidence of other disorders [and] specific psychopathologies, including anxiety disorders, attention deficit and hyperactivity disorder (ADHD), and depression.”¹³² Helping to empower adolescents with skills they can use, such as spending time in natural settings, as protective factors against depression and as ways to improve their depressive symptoms are critical in helping to lower the rates of suicidal ideation among youth. As the *American Association of Suicidology* reported, major depressive disorder is the leading psychiatric disorder associated with suicide and suicide ranks as the second leading cause of death for 15-24 years old.¹³³ With adolescent mental wellbeing continuing to worsen, nature is proving to be an effective, cost efficient tool that medical care providers can use to help adolescents improve their mental wellbeing. Some experts are even referring to this alternative

¹²⁹ Roe et al., “Green Space and Stress.”

¹³⁰ Roe et al.

¹³¹ Hunter, Gillespie, and Chen, “Urban Nature Experiences Reduce Stress in the Context of Daily Life Based on Salivary Biomarkers.”

¹³² Bratman et al., “Nature and Mental Health.”

¹³³ “Facts and Statistics.”

course of treatment as a “nature pill” and are using this course of action as a first step before (and in conjunction with) prescription treatment options.¹³⁴

Part III: Nature’s Impact on Relationships & Social Dynamics

The social dynamics adolescents face during the teen years can also increase rates of loneliness, sadness, feelings of isolation, and depression as adolescents try to thread the needle of establishing their independence and identity, making friends, entering romantic and/or sexual relationships, and navigating their high school academic journeys. Unfortunately, social media has exacerbated these feelings for many teens—even more so for adolescent females than males—as they spend hours scrolling through “news feeds” depicting friends, celebrities, and social media influencers who, in a single picture or short video, portray an image of unattainable perfection of the ideal body, hair, clothes, cars, shoes, makeup, house, or vacation. These images may also show people looking care-free, connected, and happy, which may sink a teen even lower into their feelings of sadness. This can also be true for teens who are marginalized by race, gender identity, sexual orientation, or social class. Mainstream media may not represent their identities or real life experiences, which may further deepen their sense of isolation or lack of self worth. Teens who are BIPOC or AAPI, may constantly face second-trauma as they regularly view episodes in the news or other media outlets on the violence against Black, Latinx, and Asian identifying individuals. As adolescents from these populations spend countless hours engaged with social media, they may not be afforded breaks away from the violence, hatred, and lack of humanity against people who look like them, which they also witness and experience on a daily basis. Nature experiences have been shown to improve social interactions in children, including fostering social empowerment and engagement; enhancing interracial interactions; and promoting

¹³⁴ Hunter, Gillespie, and Chen, “Urban Nature Experiences Reduce Stress in the Context of Daily Life Based on Salivary Biomarkers.”

social cohesion and support. One study, out of Australia, “discovered that residents of a community who were involved with a land management group had a greater sense of community cohesion and were more willing to work toward improving their community than non-participating individuals,”¹³⁵ while another study noted, “that participants described social support, connections and social networking as positive elements of participating in a community garden.”¹³⁶ There has also been a decrease in crime rates and violence reported in urban areas that are surrounded by more greenspace and natural elements when compared to urban areas with less access to natural elements.¹³⁷

Being in nature, which can be free of the limitations of how to look, how to feel, or how to be, provides a space where individuals can be their authentic selves. Being able to sit in a park, under a tree, or next to a stream and experience a connection with the natural world is powerful. The images adolescents absorb on social media may capture “real people” but they are not portrayed in real ways. They are portrayed through a cleverly crafted, detail-oriented lens. For adolescence, wanting to be like the people they see in the media hurts communities and limits an individual’s ability to define who they are and who they want to be. Time spent in nature helps remove the “social media veil” (even for a just moment) to give teens the space to engage deeply with the natural environment. These experiences allows them to move their bodies; to think deeply and creatively; to tap into their sense of smell, sight, taste, hear, and touch; to step into a place of wonder and awe; to consider their relationship and place within nature; to witness the impact of the changing seasons and the ways these changes affect their own observations and feelings; and to recharge their physical, emotional, and social batteries.

¹³⁵ Keniger et al., “What Are the Benefits of Interacting with Nature?”

¹³⁶ Keniger et al.

¹³⁷ Keniger et al.

Conclusion

Nature has a way of unwinding, and in some cases even undoing, many of the negative effects excessive screen use has had on the physical, psychological, and social lives of adolescents. In response, as an educator, I have used my findings and observations on this topic to increase the amount of time my students spend in nature and off their personalized electronic devices, which has had an immediate impact on my students and our class success. After a single class spent outside, playing in the natural environment around campus, my students reported feeling happier, more energized, more connected to one another, and that they felt a noticeable improvement in their day. I also noticed students loved coming to class (they even came early most days), that they developed close relationships with one another and with me as their teacher, they were more engaged and interested in the material, and that there were little (if any) behavioral issues during the term. These results only confirmed for me that as their teacher, it was vital for me to “weave in” outside time every day into the curriculum. When we are not able to go outside, due to weather or schedule restraints, my students are visually and verbally disappointed. After incorporating this approach into my classes for the last few years, my students consistently report in their end of term evaluations that their favorite part of class was the time they spent in nature. As a teacher of ninth grade students, I have found many of my students have remained close throughout the rest of their time at the school, as well as with me as their teacher. I attribute these connections to the time the students spent together outside and free of their personal devices. Though my classroom experiences are simply anecdotal, they correspond with the benefits researchers have noted on the ways time spent in nature can positively impact—even help to improve and heal—our physical, psychological, and social selves.

5 | Recommendations for Schools

Introduction

Over the past 20 years, my career in education has coincided with one of the fastest advances (if not the fastest) in technology. Not only have I been a consumer of technology, but my professional experiences as an educator have been altered by technology in ways I could not have imagined. When I began my career in the early 2000s, personalized electronic devices (cell phones, laptops, tablets, etc.) were scarce or limited—only a handful of students had cell (flip) phones and laptops. Today, however, most (if not all) students have smartphones and, as independent school educators, we use multiple forms of screen-based devices in our teachings and practices, even going so far as to require students to have computers or tablets so they can engage fully in the curriculum. Daily schedules, academic materials and curriculums, grading systems, and electronic forms of communication all occur using virtual platforms. For the past few years, many students even attended classes online using Zoom or similar programs to make remote learning possible during the COVID-19 pandemic. Some of these practices even continue today, such as if a teacher or student cannot attend classes on campus for a period of time or for inclement weather.

Though there are many benefits technology affords us as educators, and it remains a tool at our disposal, it seems that technology has evolved to become the *primary* tool we use to facilitate the educational experiences of our students. This demand, coupled with the amount of time adolescents spend online for their personal interests further contributes to the overall amount of time adolescents spend using and viewing screen-based devices. As outlined throughout this paper, there is good reason to be concerned about the number of hours teens spend online and the impact it may have on their physical development and their social and emotional wellbeing.

As a practitioner, I have thought about the ways I may be able to combat the effects of technology on adolescent wellbeing within the educational parameters I have access to. How might I be able to use my classroom not only to educate students on the effects of technology, but also as a space to help them feel better? What experiences and tools can I provide students to help empower them to navigate a fast-paced, technology-focused world; a world that seems likely to continue to be detrimental to their physical, social and emotional wellbeing?

This final chapter will offer recommendations schools may want to consider when thinking about technology use, both in and out of the classroom, for its students and community. The areas for recommendations include:

1. Limit the amount of time students spend using screen-based technology both in and out of the classroom.
2. Partner with stakeholders such as students, families, and faculty around the school's technology policies and offer educational programming and behavioral support throughout the year.
3. Build intentional academic and residential life programming that focus on incorporating nature into the student experience.

#1 Recommendation: Limit the amount of time students spend using screen-based technology both in and out of the classroom.

When I first began working in independent schools in 2004, the focus of the boarding school experience was for students to have enriching educational experiences both in and out of the classroom. This included a rigorous academic load, coupled with time spent in cocurriculars such as athletics, clubs, and affinity groups, and engagement in a residential life program. The throughline of these experiences was to build and strengthen relationships between students and adults in the community.

Though almost two decades later the focus of these institutions remains relatively the same, there has been a shift in how these connections are made, developed, and nurtured. A primary tool for connections now, both in and out of the classroom, is through the use of technology. Whether it be a digital classroom suite to access and complete academic materials, communicating with students or faculty through email or text exchanges, or signing in and out of residential or academic buildings using a virtual checkout/in app, independent schools use technology as an anchor to the daily rhythms of boarding school life. One only needs to be on a campus when the internet goes out to feel the impact technology has on the inner workings of schools: lesson plans go out the window, classes may end early, and basic functions such as email, phone systems, and access to the school's database cease until the internet connection is restored.

As educators and educational institutions, we care deeply about the growth and wellbeing of our students. Teachers and administrators talk openly about the number of hours teens spend online using screen-based media, and yet they often throw their hands up as if to say, *But what can we do?* One of the most compelling aspects of independent schools is the freedom to create and

deliver educational experiences that are free of the state and federal guidelines public schools need to adhere to. These privileges allow independent schools to have greater flexibility with the policies they implement in their schools; policies that are often driven in response to cutting edge research on the best ways to support adolescent growth and wellbeing. With this in mind, it is possible for independent schools to examine their students' technology use and to implement policies and changes to help limit their students' overall exposure to screen-based media and social networking sites. The outcomes of doing so will likely have a series of positive impacts on the students and the community.

The first recommendation for schools to consider is to create policies that *limit student use of screen-based media*. As outlined earlier, students are often unable to limit or control their technology use. Educational institutions, which are charged with caring for the physical, social, and emotional wellbeing of students, must respond by developing policies that will do this for them.

In the past few years, some schools have decided to impose sweeping bans on student cell phone use during the academic day, both in and out of academic buildings. Schools such as Deerfield Academy in Western Massachusetts recently implemented new technology policies in response to the growing body of literature on the negative impact of cell phone use on adolescent wellbeing. Deerfield's policy, "requires students to leave their phones in their dorms between 8 A.M. and 3 P.M. on Mondays, Tuesdays, Thursdays, and Fridays, and from 8 A.M. to 12:30 P.M. on Wednesdays. Additionally, there is an overall expectation of students to keep their "Heads Up" from phones while walking around campus and interacting with the community."¹³⁸ Anecdotal reports from the school after the policy's first year was that students and faculty have noticed positive trends in their community such as lower levels of sadness, anxiety, and depression, as

¹³⁸ parkjongwon.com, "Heads Up."

well as an improved sense of community. Lyla Ortiz, a new 10th grader at the school reported, “it had been easier to connect with peers on campus without worrying about the barrier that a cell-phone can create.”¹³⁹ She went on to add that seeing people with their ‘heads up’ makes the environment welcoming and warm, which allows for more emotional connections with others.¹⁴⁰ Deerfield is among a handful of independent schools that have moved toward cell phone bans or restrictions for their institutions, though it is likely many more schools will adopt similar policies in the near future. Completely eliminating cell phone use during the academic day is an impactful way to cut the number of hours adolescents spend on screens and social networking sites.

Another consideration for schools to examine is how often and in what capacities students are asked to engage with technology for their own academic learning. Within the last twenty years, technology has taken center stage for academic learning as text books have moved online, course material and curriculum is housed using web-based learning management systems, and assignments and assessments are created, edited, submitted, and graded all using online platforms. When laptops and tablets were first introduced to independent schools, it became a competitive edge for institutions to “require” students to have a personalized electronic device in pursuit of academic excellence. The research around adolescent brain development and the effect of technology on adolescent wellbeing has exploded since these early days. It is time for schools to let go of the false narrative that technology is “good-for-everyone” and necessary for academic mastery. Screen-based technology needs to remain a tool at a teacher’s or student’s disposal, not at the center for most academic subjects. By moving technology to the backseat for lesson plans and assignments, educators will open (or re-open) new possibilities for learning. For example, rather than having students create powerpoint presentations or videos to demonstrate their mastery of a subject, teachers could ask students to pick a medium that doesn’t use technology to

¹³⁹ parkjongwon.com, “Heads Up.”

¹⁴⁰ parkjongwon.com, “Heads Up.”

present their learning. This could include songs, dances, (handwritten) poems, journal reflections, or using a maker-space or fiber arts studio to make visual representations. By limiting technology use for academic purposes, students will be able to expand their creative thinking skills, to use their minds and bodies in ways that engage more of their senses (touch, sound, smell, taste, etc.), and it may allow them to make connections to other disciplines, which further expands their academic reach, learning, and connections.

For boarding schools, however, whose curriculum extends beyond the academic day, it is equally important that technology policies also carry over into the nonacademic hours of the day, particularly in the evenings and on the weekends, when adolescents use social networking sites for connecting with their peers and for personal entertainment. As discussed previously, screen-based technology has a significant impact on adolescent sleep. The majority of boarding schools no longer have policies that ban cell phones (or tablets) from a student's bedroom; enforcing this rule became difficult and problematic over time. As such, many (if not most) students use their cell phones before going to bed as a way to unwind and relax. They also keep their phones near their beds (some even under their pillows) so as to not miss an important notification during the night and/or to use as an alarm clock. These behaviors are problematic as the blue light emitted by screens not only suppresses the release of melatonin, which results in adolescents falling asleep later, but also affects the quality and duration of sleep by waking up sooner and/or having shorter periods of deep sleep, which is when key parts of the brain's memory consolidation happens.¹⁴¹

A key part of my recommendations for schools to limit adolescent technology use, is to include policies that keep cell phones out of students' bedrooms during sleeping hours. A 2019 report published in *The Sleep Research Society* found that, "the reduction of screen time after 9 pm

¹⁴¹ "How Blue Light Affects Your Sleep."

correlated with earlier sleep onset time and increased total sleep duration. The latter led to improved daytime vigilance. These findings provide evidence that restricting screen use in the evening represents a valid and promising approach for improving sleep duration in adolescents, with potential implications for daytime functioning and health.”¹⁴² Twenty years ago this type of policy was easier to enforce because so few students had cell phones and the technology was not as advanced. Today, however, the landscape for student cell phone ownership and its use has changed so drastically that it is much harder for boarding schools to enforce these policies. Some schools have found ways to get devices out of the bedrooms of students by creating docking stations that are locked during sleeping hours and unlocked the next morning. Creative solutions such as these can be very effective in limiting adolescent cell phone use during evening and sleep hours, which are critical times for student growth and wellbeing.

Limiting student use of screen-based technology, particularly personalized electronic devices, is a necessary and critical step in supporting and improving adolescent development and wellbeing. Independent school institutions have the freedom and ability to enact changes immediately that will improve the overall wellness of their students. Research and anecdotal reports have shown that the physical and psychological wellbeing of students is directly affected by the amount of time they spend on screens. Thus, it is of the utmost importance for schools to take the necessary steps to limit the amount of time students spend using screen-based media. Such policies will hopefully produce better rested students who are happier, perform better both in and out of the classroom, are more engaged with their peers and adults, and contribute to a more positive and better connected community.

¹⁴² Perrault et al., “Reducing the Use of Screen Electronic Devices in the Evening Is Associated with Improved Sleep and Daytime Vigilance in Adolescents.”

#2 Recommendation: Partner with stakeholders around the school’s technology policies and offer educational programming and behavioral support throughout the year.

For any change to be successful at an institution, it is critical to have buy-in when implementing new policies. This does not mean that everyone at a school needs to agree with policy changes, however it does require having a good understanding of the *why* in order to get folks onboard. Schools that have already enacted policy changes are helping to inspire others to take the leap as well. Though it may seem easy to add new rules to a community handbook, the reality is that cell phones and other screen-based technology have permeated nearly every facet of our lives and sweeping changes that limit, or even ban its use, could raise levels of emotions—even outrage—among school constituents. This is why intentional efforts to create understanding within stakeholders, such as faculty, students, and families is critical not only for the success of the policy, but also to help shift student behavior, which is the ultimate long term goal. One path toward achieving support for policy changes is to arm constituents with the knowledge around why these changes are essential for adolescents (and the institution) and to offer support as they engage in changes to their behavior.

The second recommendation is *to partner with stakeholders and offer educational programming and behavioral support throughout the year that outline the impact (both positive and negative) of technology on adolescent development and wellbeing.*

As consumers, we know that technology isn’t inherently “good” or “bad,” but rather it is how we use and engage with it that ultimately determines the ways technology may shape our behavior and how we feel. At this point, there is an overwhelming amount of evidence that teens are

spending too much time using screen-based media and the culmination of this use is having a negative impact on their wellbeing. But how much do students, families, and faculty know about this growing body of research? How can institutions, as educational settings, share this information in ways that call constituents in and engage them in this shared work of intentionally shaping our relationship with screen-based technology?

Informational Sessions: The first way schools can begin this work is to hold informational sessions using online platforms (such as Zoom), *prior to the start of each academic year*, to outline the school's policies on student technology use. Though it may seem hypocritical to use online platforms to deliver this information, virtual meetings like these allow for greater access for all families to hear important school information. It would be helpful for these sessions to include general facts and statistics around the trends of adolescent technology use and the impact these behaviors are having on adolescent development and wellbeing. There should also be time during the meeting for families to ask questions, which will allow for greater understanding around the reasoning for these policy changes. Opportunities that engage students and their families in the same meeting not only allow for families to hear the information at the same time, but it also creates an opportunity for families to discuss the information together after the session and prior to the student's arrival on campus.

Educational Programming: Educational programming for students, faculty, and families could be offered regularly throughout the year to help the community understand the impact of technology on adolescent wellbeing and why this is a priority for the school. This can include student orientations that are tech-free; bringing in outside experts to speak to faculty during professional development days; providing online learning opportunities and small breakout groups for families to engage with one another; and include technology units in academic and

campus life curriculums such as health classes, advisory discussions, and dorm programming.

Types of programming may include:

- The effects of technology on adolescent social, emotional, and mental wellbeing.
- The impacts of social media on different racial and gender identities such as BIPoC, AAPI, female, and non-binary.
- The impact of screen-based devices on adolescent sleep.
- Technology and adolescent risk-taking behavior such as sexting, cyberbullying, and harassment.

Engage Student Leaders: It would be important for schools to partner with their student leaders to help get buy-in for the school’s technology policies. These selected individuals are generally trusted by the student body and are essential components in building student culture. Student leaders could be tasked with giving presentations at all school meetings, facilitating technology discussions during dorm meetings, or helping to create student activities that are screen-free. As educators, we know that peer-to-peer education is often the most impactful and influential. These opportunities may help students reflect on their own screen use use and provide opportunities for them to interact with their peers without the barriers of cell phones. Experiences like these are low-stake ways for students to practice and develop these important social and emotional skills.

Partner with School Health & Wellness Centers: Schools should work with their health & wellness providers to incorporate “excessive screen use” evaluations during student physical examinations and mental health sessions. As shared earlier, medical experts and researchers are seeing a rise in adolescent physical ailments such as eye strain and myopia, headaches and migraines, neck and back pain, and difficulty sleeping to name a few. Adolescent technology use is interwoven into their daily lives and understanding a student’s relationship with their personal electronic device(s) is critical in evaluating whether or not it might be related to physical ailments

the student is experiencing. Having an “excessive screen use” evaluation as part of the initial intake of when a student is seen at the health center could provide pivotal information on the underlying causes of a student’s complaints. For example, if a student was evaluated at the health center for chronic headaches or migraines, part of the medical examination could ask students to report their technology use over the past week. One way to retrieve this information is by using the “screen-time” analytics report that most smartphones have in their general settings. Though excessive screen time may not be the only cause of a student’s illness, having this information as part of a student’s regular intake process may provide important data (both in the short and long term) and could be used as part of the treatment plan toward helping students feel better. This information might even change the medical care provider’s recommendations and course of treatment. For example, medical experts advise that screen use should be restricted for adolescents with migraines and tension type headaches before using pharmacotherapy.¹⁴³

Similarly, numerous studies cite the growing concerns on the impact of screen-based media on adolescent psychological health. American psychologist Dr. Jean Twenge and her research team have been pioneers of this research. A 2018 report in which they examined generational differences in the psychological wellbeing of teens for the past 25 years found:

In nationally representative yearly surveys of United States 8th, 10th, and 12th graders 1991–2016 (N 1.1 million), psychological well-being (measured by self-esteem, life satisfaction, and happiness) suddenly decreased after 2012. Adolescents who spent more time on electronic communication and screens (e.g., social media, the Internet, texting, gaming) and less time on nonscreen activities (e.g., in-person social interaction, sports/exercise, homework, attending religious services) had lower psycho-logical well-being. Adolescents spending a small amount of time on electronic communication were the happiest. Psychological well-being was lower in years

¹⁴³ Caksen, “Electronic Screen Exposure and Headache in Children.”

when adolescents spent more time on screens and higher in years when they spent more time on nonscreen activities, with changes in activities generally preceding declines in well-being.¹⁴⁴

The findings of Dr. Twenge’s research, along with dozens of other reports, underscores the importance for mental health care providers to evaluate students during their sessions on their their daily screen use, particularly for high-risk students with underlying mental health concerns such as sadness, anxiety, depression, and suicidal ideation. Additional studies have shown that students with these predispositions generally use technology at higher rates.¹⁴⁵ Not only might mental health care providers be able to identify if students are using screen-based devices at excessive rates (which might be having a negative impact on their mental health) but they can also help students reflect on their technology behaviors and create a plan of support.

Provide Updates & Solicit Feedback: Throughout the year, it would also be important for the school to provide updates on how the school’s technology policies are going through feedback from its constituents. Similar to what the student from Deerfield Academy shared about her experience, it would be important to share widely anecdotal comments on what students are seeing, hearing, and feeling in response to the technology changes; what faculty noticing in their classrooms, on the fields, in the dining hall, and in the residential spaces; and what families are hearing from their students and what is their overall sense of how their student is feeling physically and psychologically.

Many teachers, parents, and even students are waiting for schools to respond to and take action on the effects of technology on adolescent wellbeing in their institutions. To enact successful policies that make a difference in the lives of its students, schools need to create meaningful partnerships

¹⁴⁴ Twenge, Martin, and Campbell, “Decreases in Psychological Well-Being Among American Adolescents After 2012 and Links to Screen Time During the Rise of Smartphone Technology.”

¹⁴⁵ McBride, “Daily Digital Technology Use Linked to Mental Health Symptoms for High-Risk Adolescents.”

with their constituents. For technology policies to be successful at independent schools, students, faculty, and families need to understand the *why*, which means creating opportunities for educational programming and behavioral support to help students redefine their relationship with the personalized electronic devices.

#3 Recommendation: Build intentional academic and residential life programming that focus on incorporating nature into the student experience.

Experiences in nature can have a profound impact on the physical, psychological, and social wellbeing of adolescents. Though limiting the amount of time teens spend on their screen-based devices and getting school constituents on board for these changes are both critical steps toward improving adolescent health, it simply is not enough. To really make headway on improving the wellbeing of teens today, nature—specifically experiences in nature—must be an essential component in both the academic and residential life curriculums at independent schools. One of the benefits of independent schools is that teachers are given a wide berth on how to teach their students. Though each department has a list of core topics and objectives instructors should hit by the end of the course, for the most part, classroom teachers are given the freedom to deliver the information as they see best. This type of instructional flexibility is ideal for developing ways to incorporate more time outdoors into class curriculum.

There are many subjects that naturally bring students out to waterways, fields, or forests to study the flora and fauna that live there. For example, environmental science classes can use waders to examine algae blooms in a campus pond, or studio art classes can set up easels and acrylic paints along hillsides during their landscape painting unit. Examples like these are wonderful ways to

incorporate experiences in nature into a unit that emphasizes the natural world. What might be even more effective is to ask all departments to build time outdoors into at least half of their classes each week—especially for courses which are generally less likely to have units that bring students outside as part of their learning, such as math, language arts, history, performing arts, and English. Incorporating nature into a class period could be something as simple as having students begin class outside where they find a “sit spot” and do quiet reflective journal writing for five minutes. Another idea a number of schools have begun to utilize is having outdoor classrooms scattered throughout their campuses. These classrooms are basic and can be cost effective by including benches, stools, or simple tree stumps for students to sit on and whiteboards for students and instructors to write on. The goal of the lessons can be the same, but changing the location to be in an outdoor environment can provide students a completely different classroom experience to engage with the material, which, as studies have shown, can increase imagination and creativity, reduce attention fatigue, increase self-esteem, problem solving, and motivation to learn, reduce ADHD symptoms, and produce significant gains in a student’s overall learning of the subject. In fact, Finland is an example of a country that prioritizes this type of environment-based education, and year after year, Finnish students prove to be some of the best (if not the best) performers in the world for reading, math, and science.¹⁴⁶ Finland’s schools have prioritized building a “substantial amount of classroom experience into natural settings or the surrounding community.”¹⁴⁷ As Finland’s Ministry of Social Affairs and Health states, “The core of learning is not in the information...being predigested from the outside, but in the interaction between a child and the environment.”¹⁴⁸ Increasing the amount of time students spend outdoors as part of their overall academic experience is likely to have a series of positive effects on their learning, growth, and academic success. These features are especially relevant for independent schools whose academic programs are rigorous and highly demanding.

¹⁴⁶ Magazine and Hancock, “Why Are Finland’s Schools Successful?”

¹⁴⁷ Louv, *Last Child in the Woods: Saving Our Children from Nature Deficit Disorder*. (p.203)

¹⁴⁸ Louv. (p.203)

In addition to the academic curriculum, students at boarding schools also have to navigate a residential experience that occurs within the “creases” of independent school life, such as in the dining hall, residential buildings, or during weekend activities. It is in these spaces that many of the social interactions between students occur and schools often provide programming around topics such as healthy relationships, consent, identity, conflict resolution, and technology use as a way to help students develop the skills they need to engage in these settings in positive and productive ways. Incorporating this type of programming into outdoor spaces will only continue to give students breaks away from their screen-based devices and provide them with more opportunities to connect with the natural world. For example, offering students (low environmental impact) portable food options and outdoor dining spaces allows them to engage in the natural world while also connecting socially with their friends.

During the 2020-2021 COVID-19 school year, many boarding schools required student meals to be on-the-go for health and safety reasons. As a faculty member at one such school during this time, I regularly saw students sharing meals together on green spaces outside the dining facility. Though this was a difficult year for many reasons, this was one of the few places I saw students smiling, laughing, and letting their guard down. Since then, students continue to report how much they loved the option of eating outside and have regularly asked for it to return.

Even if a school is not able to provide outdoor dining on a weekly basis, incorporating outdoor picnics or special events with food into greenspaces around campus can have a positive impact on student connections and wellbeing. Events such as weekend s’mores around a campfire or hot chocolate with ice skating on a frozen pond are simple and inexpensive ways to get students outside and engaged with one another. Other ways to incorporate nature into the residential life program might include using residential student leaders to lead walks outside one night a month

in lieu of a dorm meeting to look at the stars, the moon, or to simply listen to the sounds of the night sky. Conversations around topics such as identity, relationships, and conflict resolution could also occur in outdoor settings such as in the outdoor classrooms or under the shade of a tree outside a residential building.

The key to incorporating the outdoors into academic and residential life programs is to keep it simple and manageable. Though rural independent schools, with campuses immersed in large natural settings, have greater access to natural features than independent schools located in urban locations, nature is all around. As educators, it is up to us to help guide, show, and inspire students to engage with the natural world no matter the size of the greenspace. In his book, Richard Louv touches on the importance of getting kids connected with nature regardless of age or the size of the location. In a passage from his chapter titled, *The Nature-Child Reunion*, he writes:

“Your job isn’t to hit them with another Fine Educational Opportunity, but to return them on to what a neat world we live in,” writes Deborah Churchman in the journal *American Forests*, published by the nation’s oldest nonprofit citizens’ conservation organization. She recommends re-creating all the dopey, fun things you did as a kid: “Take them down to the creek to skip rocks—and then show them what was hiding under those rocks. Take a walk after the rain and count worms (they’re coming up for air since their holes are clogged with water). Turn on a porch light and watch the insects gather (they’re nuts about the ultraviolet light—for some reason scientists haven’t yet figured out). Go to a field (with shoes on) and watch the bees diving into the flowers.” Find a ravine, woods, a windbreak row of trees, a swamp, a pond, a vacant and overgrown lot—and go there regularly. Churchman repeats an old Indian saying: “It’s better to know one mountain than to climb many.”¹⁴⁹

¹⁴⁹ Louv. (p.171)

Louv's passage also underscores the importance of giving students unstructured time in nature, to follow their innate curiosity, imagination, and interests. Schools should aim for a balance between both structured and unstructured time outdoors when planning their academic and residential life programs. Spending time in nature without an agenda allows students the freedom to decide how they want to use their time and where they want to explore. This can lead to moments of self-directed play (even as teenagers) and great joy. It also takes the pressure and stress off of students to retain necessary information or to perform academically. The students can simply be free to take a deep breath, to laugh at a funny moment with a friend, or to process a difficult moment they may be carrying; all important benefits to the overall health and wellbeing of adolescents.

Moments like these allow students to connect to the natural world, and helps them relate to ecosystems and other forms of life; to think about their place, their role, and their impact in the world. These connections also help build a greater sense of awe and wonder for nature, which is critical now more than ever as climate change bears down on the world. As adolescents spend less and less time in the natural world, the concern is that they will have limited respect for their immediate surroundings. As Louv writes elsewhere in his book, "Reducing the deficit—healing the broken bond between our young and nature—is in our own self-interest, not only because aesthetics or justice depends on it, but also because our mental, physical, and spiritual health depends on it. The health of the earth is at stake as well."¹⁵⁰ Building intentional academic and residential life programs that let students spend time in nature not only may improve their physical, psychological, and social health, but may also reconnect students with the natural world in ways that create the next generations of stewards and environmental leaders.

¹⁵⁰ Louv. (p. 3)

As we've seen above, though students may choose to be outdoors during their free time, recent data suggests that students prefer instead to stay inside. In this final recommendation for schools, the importance of creating intentional programs—both in and out of the classroom—that provide students with structured and unstructured time in nature can have protective and immediate positive impacts on their overall health and wellbeing. Dedicating time during the week for classes to be outside, as well as during residential activities such as meal times or student activities, gets students immersed in nature when they otherwise may choose not to be. Viewing nature as a “healer” for some of the negative impacts excessive screen use may be having on adolescent wellbeing is a tool many independent schools have at their disposal and that they can readily incorporate into their student experience.

6 | Conclusion

As I reflect on the ways in which my observations and experiences in boarding schools have changed over the last fifteen years, it is clear the introduction and prioritization of screen-based technologies has played a pivotal role in the decrease in adolescent wellbeing. This paper examined the many ways excessive technology use affects both the physical development and the social and emotional wellness of teens. I have gained significant knowledge around this topic, which I will continue to use in my work with students, but I end this body of work perhaps with more questions and thoughts that may not be resolved for some time.

The first is, what does the future hold for the “always on” generation? Between their physical ailments and disabilities, and to their mental health struggles, who knows what’s to come in the next fifteen years. If the ways we are currently supporting the physical and emotional health of adolescents is a future predictor, then the outlook does not look good. As a society, we have never experienced anything like the effects of technology on today’s young people and I argue our response is not good enough. We must move faster to put boundaries in place that will protect adolescents from excessive technology use. In my opinion, one way to make a significant impact on adolescent wellbeing is to ban cell phones from schools. For many adolescents, there are little to no restrictions on their technology use at home. By creating policies in schools that prevent students from using their phones, they will at least have multiple hours in the day where they have a break from their devices, which can have a significant impact on improving their wellbeing. Some schools have chosen this path, yet I fear most schools will wait for lawmakers to demand these changes in their school districts, which may take years.

While we wait for these regulations to come, which I truly believe they will, I wonder how much further we will allow the wellbeing of our youth to deteriorate. It is clear adolescents are not able to control their cell phone use, and I can't help but wonder why so many parents and guardians continue to give their children devices, despite what they hear or read in the news.

This question has continued to play in my mind following a recent conversation with one of my students. After finishing our 9th grade health class unit on technology, I was surprised to see Waylan still sitting in the classroom once I had finished wiping down the boards. I could tell he had something heavy on his mind. I asked Waylan if he was okay, to which he replied with a deep sigh. He went on to tell me that he was worried he might be addicted, or in the very least developing an addiction, to his phone. The class had learned moments earlier that Waylan got his first phone at the age of fourteen, and though he had only had his phone for a few months, he was terrified he wouldn't be able to reverse the impact it had already had on his life.

During Waylan's middle school years, he was crazy for basketball. He couldn't wait to get home from school because as he described it, *basketball was the only thing I thought about and all I ever wanted to do*. That day after class, however, Waylan confessed that he was worried about how little control he felt he had over his cell phone use. It was heartbreaking to hear him say that since he had gotten his phone, though he still tried to play basketball in his driveway afterschool, all he could think about was going inside to be on his phone.

After Waylan shared his story with me, I remember feeling physically sick. I couldn't get the image of him standing in his driveway, holding his basketball, and staring at his house out of my mind. It was almost as if the device was calling him, willing him to come in and use it. I asked Waylan if he had talked to his parents about his concerns. He grew visibly uncomfortable with this question and shared that it was difficult for him to bring this up to his folks because they were

also always on their phones. Waylan described that though he knew his parents loved him, how could he trust their judgment on technology when their own relationship with devices was problematic?

I was impressed with Waylan's self awareness and revelations, but I was also angry. Why are we still giving children access to devices that can physically, socially, and emotionally harm them? Further, as adults, how can we be so negligent of the influence our own technology use is having on our children? If we are to truly turn the tides on their wellbeing, we must hold the mirror up and include our own personal technology use as part of the impact. The children are watching us and, as with so many aspects of their learning, they are taking their cues from the adults around them.

I want to say I am hopeful that there will be limits and regulations on technology use for adolescents coming in the near future, however it seems unlikely. This leaves children and their caregivers to confront not only social issues, but also developmental and neurological issues, where physical changes may have already been made. I was recently running a life skills workshop for a group of seniors around the impact of technology. I was getting to the part when I shared the ways overuse can impact the physical development of teens when one of my students, Skylar, jumped in. She was eager to tell me how she already knew about this because of what happened to her when she was attending "Zoom school," which was what she called the year and a half she spent going to school online at the height of COVID-19. While Skylar was taking her classes online, she developed chronic headaches and her vision went blurry. After visiting her ophthalmologist, she learned that the number of hours she spent using screen-based devices actually changed the shape of her eyes. Her doctor prescribed glasses to fix the blurry vision and headaches, though the physician seemed certain Skylar would wear glasses the rest of her life. Examples like the one Skylar shared with the class illustrate the concrete ways excessive

technology use directly impacts the quality of life for children. My concern is what additional limitations, disabilities, and/or negative repercussions are still to come, and like the illnesses we've seen, such as depression, anxiety, headaches, blurred vision, and backaches, which only continue to rise, are we equipped to support and treat the issues?

I've shared a number of stories throughout this paper on the ways I've observed the negative impact of technology on teens. The reality is, I have dozens, if not hundreds more I could write about. It seems every day I am at school, I witness a new scenario or interaction that leaves my hairs standing on end. Though my outlook might not be overly optimistic, we must stay focused on what's important. As educators, we believe students can learn. The wellbeing of each and every child matters, and even if we cannot enforce sweeping mandates that limit tech use for our students, we can use education not only to share the impact technology has on their health, but to also improve it. We have to believe education will work; my experiences with students together in the classroom and in nature have given me enough reasons to remain hopeful for the future.

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